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MAY 1988

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Codename: Droid is a challenging arcade-adventure. The quality of the graphics and animation must be seen to be appreciated. Electron User summed the game up by saying "CODENAME: DROID is brilliant . . . it's worth every penny."

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ACORNUSER

ISSUE No 70 MAY 1988

COVER



COVER FEATURE

Artificial intelligence on a BBC micro — our Micro-Sherlock program on page 81

Photograph: Barbara Bellingham

Olivetti has made its strongest commitment to Acorn so far. The assurance of continuing Olivetti support given to the Secretary of State — reported in this issue — will do much to bolster the credibility of the company. So will the marketing strength of the new management team, headed by Harvey Coleman.

Aided by the extra visibility of the Arc, Masters are selling as well as they ever did. Three quarters go into education, and schools are still buying BBC Bs on the second-hand market. A few authorities are now taking the Arc in reasonable numbers. Some measure of confidence is beginning to return to the educational part of the Acorn world. There are better indications of forthcoming Arc software too, with *First Word Plus* and *Pipedream* both about to be released.

The new boys seem to be putting new life into Acorn.

Graham Bell, Editor

READER SURVEY

FEATURES

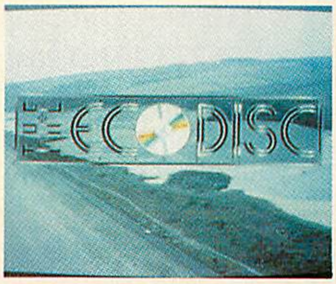
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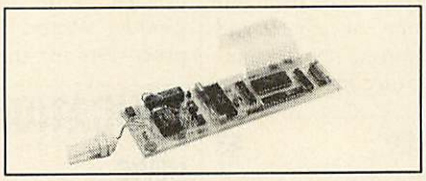
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NEWS

News in brief

■ The voucher scheme which reduces the price of the Domesday interactive video system to a more affordable £3000 is being extended again. It should now run until the end of this year, subject to approval by Philips which makes the laser disc player.

■ Despite much moaning from certain quarters about the need for business standards, little MS-DOS software has ever been converted to run in the BBC environment. Now a program is travelling the other way. An MS-DOS version of *Pipedream*, the version of *View Professional* supplied with the Z88, is being developed by Colton Software. When this is released later this year the programmers will turn their attention to other machines.

■ Using your Archimedes with unbuffered external disc drive cables will damage the machine, so CJE Micros has produced a buffered interface for £30. Another £8 adds on a drive-swap switch which allows access to MS-DOS programs which have to be in drive A:. A DFS reader for the Archimedes is also available for £15 but the company warns that not all disc drives are compatible with the machine. Check with Acorn's customer services, your dealer or CJE before switching on.

■ Acorn has produced two Archimedes podules in competition with Resource and Computer Concepts, calling them internal expansion cards. A ROM card provides space for five 16K to 128K ROMs or EPROMs, and two static RAM chips can also be added. This costs £67.85. The second card contains a variety of input and output interfaces and allows peripherals compatible with the BBC to be added to the Archimedes and costs £90.85.

Acorn looking to expand

Acorn is preparing to enter the 1990s with a strategy to support its loyal base in the home and education market, and to develop strengths in new areas. Although the company made a loss last year, its future has been guaranteed by owners Olivetti in a message to Secretary of State for Education Kenneth Baker.

Acorn's managing director Harvey Coleman said 'We've had some significant financial problems in the past but it has become clear that Olivetti's support for Acorn is a continuing element. They consider it a very important mission as part of their group.' He explained this to Baker and the DES to allay fears that Acorns' long-term future was doubtful.

Support for education will be seen in improving the level of service provided, supporting software development and ensuring that the machines are competitively priced for schools' limited budgets.

Another area of support is software development; Coleman claims that over 200 packages have been released for the Archimedes since its launch. Work begun in the educational sector supporting software development is being extended to other areas. Acorn is providing both cash and assistance in matters such as finding test sites for developers.

Sales and marketing manager Ian Laurence feels that Acorn's work in education brings benefits for business users.

He says, 'The nice thing about being in education is that our educational customers are very sophisticated and do lots of different things with the machines. The spread of users is huge.' Office computers are used almost entirely for one or two applications.



Coleman: developing new areas

Laurence envisages potential business users being impressed by the computers' versatility compared to PC clones.

Future developments will be based on exploiting RISC technology. 'RISC is the way companies are going, the way of the future,' says Coleman. Acorn will be seeking niche markets, where particular machines are tailored to specific uses.

New machines based on the RISC chip are also likely, and a Unix workstation will be the first to become available, priced at between £5000 and £10,000, significantly higher than the Archimedes range.

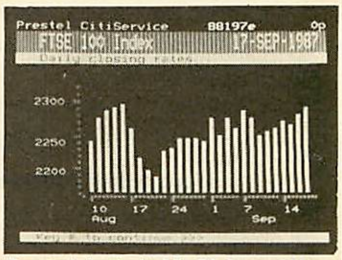
Telecom link-up

A management shake-up at British Telecom has led to the re-organisation of electronic mail and communication facilities. From last month some subscribers to Prestel and Telecom Gold were being offered membership of a combined service, Dialcom UK.

The first people to benefit from the change will be users in education. Local education authorities have been offered subscriptions at £292, compared with the Prestel-only price of £192, but with substantial discounts available if they put all the schools in their area on the Dialcom UK system.

Links from one service to the other are being provided by giant 'gateways'. Previously it was possible to send mail to users of the other system but not much more.

Telemap Group Ltd had already been looking for ways to make the Prestel-based conferencing system Teletalk accessible in Telecom Gold format. The company is also preparing to launch Inter Business, a Telecom Gold format business service later in the year.



Prestel: included in Dialcom UK

Micro mystics

Religiously minded computer users can turn to a new publication from Jaybooks. The publishers believe that Sunday school classes can be made more interesting through the use of computers and *Micros with a Message* shows how this can be achieved. Chapters cover hardware, software and uses as well as providing a list of contacts for help and support. Subtitled 'Computers in Christian Youth Work' the book costs £1.85 from religious bookshops.

A further View

After bringing BBC Basic to the Mac, Human-Computer Interface has come up with a program to transfer *View* files into *MacWrite* keeping the original format. Schools can use their familiar wordprocessor and transmit text to the Macintosh for DTP output. Including a demonstration of the package it costs £56.35.

Flights upturn

The recent spate of near misses over London's skies has revived interest in Hewson game *Heathrow International Air Traffic Control*. Written by real-life air traffic controller, Mike Male, the game gives a control tower view of aviation. The player must guide a plane over London and land, without collision, at Heathrow. The simulation is available for the BBC B and Electron for £7.95.

Control power

An interface package from Creuzet Ltd enables your BBC B or Master to simulate a programmable controller. Aimed at education and home enthusiasts, the package can examine information programmed into the Beeb and apply it to technical devices through the interface. The package costs £300.

Music 87 dropped after complaints

The problematic Peartree Music 87 software has been withdrawn from the market a month after the company began distributing copies. A letter sent to customers explained that owing to circumstances 'beyond our control' their money was being returned.

AU reader Peter Clements was surprised to receive the letter and refund after waiting almost eight months for his software. 'They promised it would arrive in time for my birthday. I'm very disillusioned with Peartree.'

Another reader received a copy however, Ian Griffiths found that bugs in the program resulted in it deleting itself. He found it slow, 'trying to do too much at once'.

Peartree's policy represents a change of heart; around 200



No longer advertised

copies were sent out with a delivery note saying that Peartree would not allow the software to be returned if opened.

Said Peartree managing director Vartan Mundigian 'We decided to take it off the market two weeks ago. It has blackened our name.'

He blames Dinosaur Software, which wrote the software, for causing delays and producing sub-standard work.

However Sahlan Diver of Dinosaur claims that the program is acceptable. 'You would expect there to be bugs in such a big program. We are working on improvements.'

Peartree also said that readers who had received Music 87 hardware could choose either to return it for a full refund, or keep it as a Music 500.

■ Hybrid Technology used to make the Music 500 on which Peartree's product was based and hopes to offer an upgrade package to leave Music 87 owners with Hybrid's Music 5000. Anyone interested should contact Hybrid Technology.

A first for micro music

A Bedfordshire primary school is developing the use of electronic music in first schools, with the aid of the Schools Curriculum Development Council. Headteacher Patricia O'Byrne received £750 to buy a Hybrid Technology Music 5000 and a BBC Master for her school, St Vincents Lower School.

She is encouraging the development of electronic music in primary schools. Children have been using sound effects in drama classes.

'They are exploring the sounds they get from the system. They produced the sound effects for our Easter musical' said Mrs O'Byrne.

At the end of the school year when the children have gained



Pupils 'took to the computer like ducks to water'

experience and confidence there is another treat in store. Bedfordshire LEA has a 'music bus' containing eight complete music systems which travels between its secondary schools. For the first time it will be visiting a primary school.

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Erasure: Interviewed next month

BBC micro is a hit

Music fans have another opportunity to hear the BBC micro and UMI MIDI system in action on *Top of the Pops* following the success of the new Erasure single 'Ship of Fools'. The song was ascending the Gallup rankings 'with a bullet' as we went to press.

If you're lucky enough to have tickets for Erasure's tour take a good look at the computer sitting next to Vince's keyboard. That's a BBC Master hiding there, running much more of the show than you might think. Read our exclusive interview in next month's issue.

Megabyte buffer

To prevent slow printers from tying up your Archimedes for too long, Clares Micro Supplies has produced a 1Mb printer buffer.

The buffer costs £19.95 and will work with any legal program on the Arc. Clares will be hoping to sell some to Scottish schools; the company has signed a deal with the Scotland Educational Forum which represents most Scottish LEAs to supply its programs in bulk.

School admin on Arc

Minerva Software is keeping its promise to launch specialist software for the Arc with the release of accounting and school administration programs.

School Administrator is based on the company's *System Delta Plus* database, so much so that you need the £69.95 database to run the program. The education application covers the day to day running of schools, pupil records and individual timetables and costs £74.95.

'We have had a lot of interest from LEAs' said Minerva's Nova Fisher. 'We are working with them on the development of profiling software and timetabling programs'.

The business accounting suite also requires *System Delta Plus*. Its five modules are available separately, at £64.95, or all together for £280. The program is full of features including security passwords and customer name archives. Details can be exported to Minerva spreadsheet *SigmaSheet* and business graphics program *GammaPlot*, both due for release soon.

THE COMMS COLUMN

■ Micronet 800, or Telemap, as it is called these days, has opened yet another new area for subscribers. Teletalk is a conferencing system, which is something like a chatline, already popular on the system, except that only a couple of lines are taken up with the message you type, and so you can see on screen the last few things that have been said.

The service was launched with an 'on-line press conference' attended by your intrepid reporter. Users enter the conference centre, pick up room keys and can even visit a bar for more informal discussions.

Private conversations can be held in the rooms, and the 'door' can be locked if you wish. Commands will be familiar to anyone who plays adventure games. It certainly makes chatting to other users a lot easier than using mailbox or chatlines. Full on-line help is available.

Teletalk is currently provided through a Prestel gateway, and supports only the 40-column viewdata format, but an 80-column scrolling version is under development. The service costs an additional 3p a minute on top of all your other charges.

Staying with Prestel, a new section for Z88 users has opened on page 810429, and there is an Acorn/Z88 gallery on page 811220099. Micronet is on (voice) 01-278 3143.

■ Marcus Anselm, the enterprising 14-year-old sysop of the Marctel bulletin board, (01-346 7150, V21/V23 24 hrs scrolling 8-N-1) and publisher of *FBBS*, the low-cost BBC bulletin board software, has just published issue three of his free quarterly magazine, *Off-Line Release*, which is now fully typeset and printed. The current issue contains information on how to book holidays using a modem, a beginner's guide to Prestel, bulletin board reviews, and two competitions.

If you'd like a copy, Marcus asks that you leave a message on his board, or write to Marctel, Gloucester House, 122 Gloucester Ave, London NW1. As Marctel is non-profit making (show me a bulletin board which isn't!) an A4 (12-inch x 9-inch) SAE would be appreciated.

■ Following from last month's Telecom Gold demonstration number, Microlink has opened a demonstration account. You can use it to see the system's facilities. To access this, dial the usual Telecom Gold London number (01-583 1275 for 1200/75 baud, or 01-583 1200 for 1200/1200 baud), and press Return. Then you should type CALL 72 <Return> followed by ID MAG 111 <Return>. The password is DATABASE.

A series of menus will guide you through the system. Note that both this and the demo account reported last month can only be accessed by direct dial, so even if you know the Microlink access codes for PSS, you can't see the demo that way.

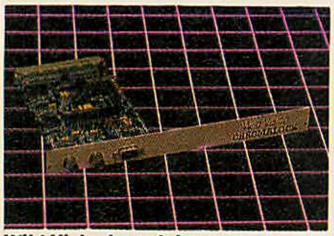
An interesting aside to these demo accounts is that although they can receive mail you can't read it, as you never return to the Gold prompt. The demo accounts have been stacking up quite a few messages, so you maddeningly have to quit with unread messages still waiting. Microlink's voice number is (0625) 878888.

David Atherton

If you have any comms news for David Atherton, you can write to him here at *Acorn User*, or contact him through his mailboxes on Prestel 942876210 and Telecom Gold 72:MAG11596.

Visionary podule

Wild Vision, the video company, is anxious to remind readers that it released one of



Wild Vision's podule

the first and certainly the most innovative Archimedes podule. Its video genlock and colour overlay expansion card (as Acorn is now calling them) is selling well to users eager to exploit the Archimedes' graphics. Two versions are available, a domestic one at £340 and a professional one at £455. A chromalock device is also available for the Master.

News in brief

■ 'Musicfocus', a new Prestel database, boasts over 2000 pages of information on popular music. Other features include a 'gig guide', album and single reviews and a 'fan line' bulletin board.'Musicfocus' can be reached by keying *3450#.

■ Thrusting yuppies eager to step into the boss' shoes should rush out and buy Professor Ronald Brech's latest business simulation. In *Don't Panic*, the owner of the Castaway Shirt Company has a heart attack and you, his junior, have to take over and run the company.

The 80-track DFS program costs £30 from RBRC software.

■ *Acorn User* is looking for a sub-editor. Previous experience of sub-editing is essential, as is familiarity with computers. Salary is negotiable. Applications including CV should be sent to Julie Carman, Chief Sub-editor, Redwood Publishing, 20-26 Brunswick Place, London N1 6DJ.

SID knows someone who can help you

Troubled Acorn users with insoluble problems have a new helpline provided by the company itself. Called SID (Support Information Database) the service is in viewdata format. There are three sections, general advice, a telesoftware library and a bulletin board. Access is via the X25 network so all calls are charged at local rates.

The catch is that there is a £40 subscription charge to take full advantage of SID. Anyone who feels that that is too much can look at some of what they are missing; the viewdata pages are on open access through a Cambridge telephone number: (0223) 243642.

Information services manager Martin Grantham said 'It is and it isn't expensive. Remember, it costs us a lot to run the service. If you subscribe you save on the phone charges, and you are able to set up closed user groups. And of course people subscribing in bulk as a closed user group can negotiate a reduced subscription.'

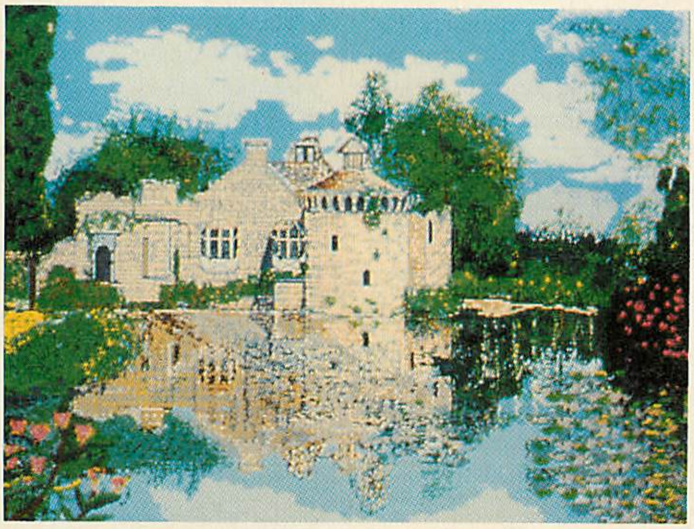
Users without communications facilities should continue to write with their problems to Acorn's customer services or phone their dealer.

Flying Start for Acorns

Mitre Software's *Flying Start II* data management system will now run under the Master 512's co-processor. A fully memory resident program, it will also run on the Arc under the PC emulator on the 310 and upwards.

Costing £69.95, the database is fully relational; up to five separate subsidiary files may be linked to any one primary file.

Arc users need not rely on the emulator much longer. Mitre is currently developing a version which will run in the native ARM environment. It should be ready in a month.



Artisan winners

This month's winner of the Artisan competition run by Clares and *Acorn User* is printed above. The landscape shows Scotney Castle, a National Trust property in Kent. It's been drawn by Paul Gilbert of Weybridge, also in Kent, and he wins a bumper box of 3.5-inch discs. The standard of the pictures is improving each month.

Can you do better? Clares and *Acorn User* are offering a box of 20 3.5-inch discs to the person who draws the best picture with *Artisan* each month.

The best of the monthly winner's pictures will be turned into a real oil painting by Clares' artist-in-residence, Jon Warmisham. Judges of the competition will be Dave Clare, Jon Warmisham and *Acorn User*'s Tony Quinn.

Send your entry on disc to Clare *Artisan* Competition, 98 Middlewich Road, Northwich, Cheshire CW9 7DA. Please include postage and self-addressed packaging if you want your disc returned.

Special needs in Scotland

A range of software for special needs is now available from the Scottish firm Scetlander.

Picture Gallery Suite is designed to evaluate visual perception. It can be adapted to individuals needs, for example, by controlling scan speed.

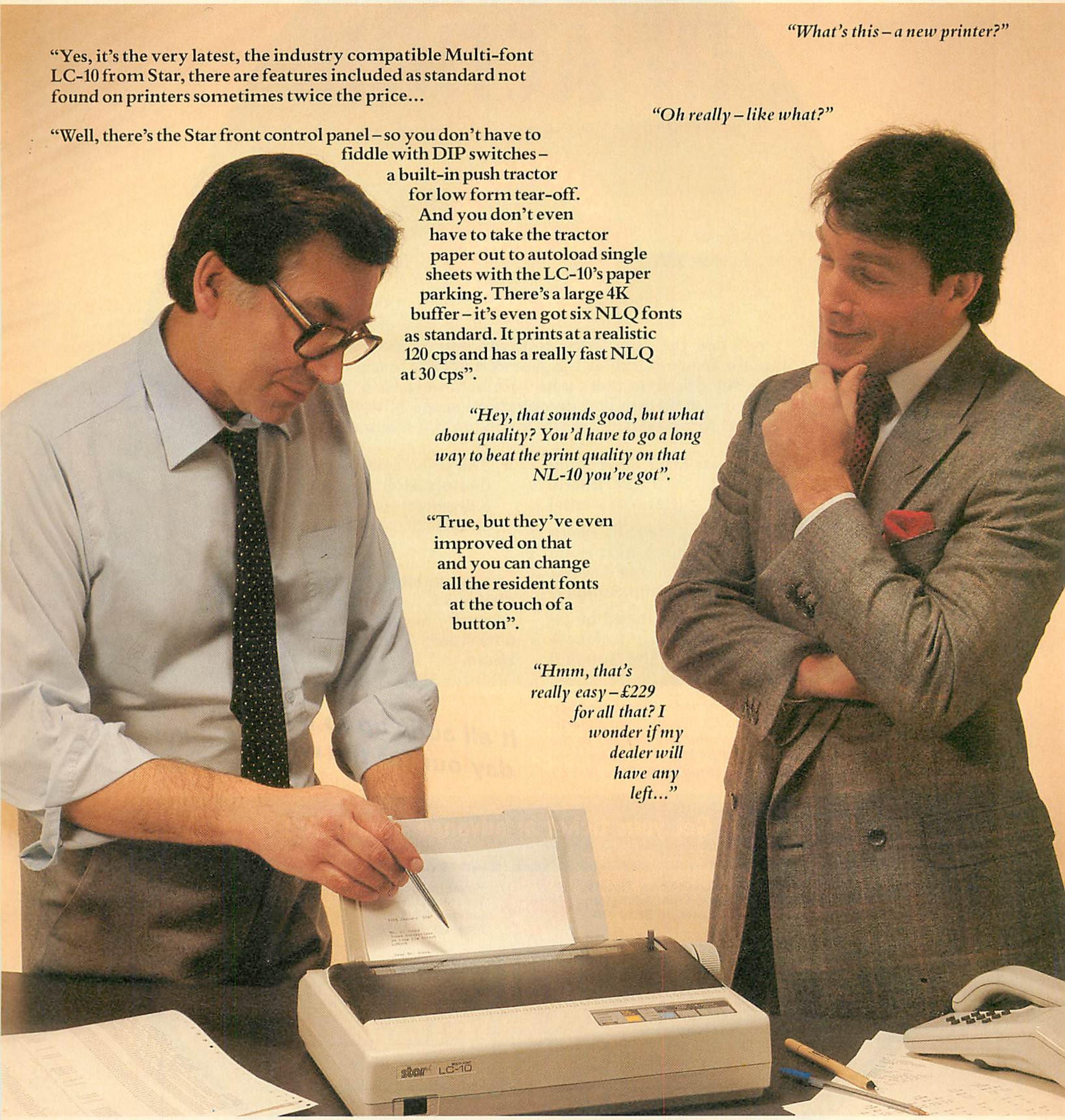
Storybook Generator enables manually dextrous students to create a storybook, with text pictures. The completed storybook can be printed out.

Developed by the Scottish Council for Spastics, *Electra Pen* is a high resolution drawing and painting program for the severely disabled. A speech synthesiser allows oral communication.

CAD-Master is another graphics package with a speech synthesiser, for high resolution monochrome drawings.

Electra Pen (£27.50) is Master compatible. *Storybook Generator* for the Master costs £25, and *Cad-Master* £22.50. The *Picture Gallery Suite* is available for the BBC B, B+ and Master (£25), and the Compact (£26.50).

"£229 for all that?"



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ACU5

BLUNDERBOX

Several bugs crept into the last issue. In Bruce Smith's new Step by Step feature, the last two diagrams were switched. The picture from the 'Reading in write' section was swapped with 'Writing the balance'.

Those of you who bought the disc expecting Bruce's *ViewSheet* demo files might have been disappointed. They now make an appearance on this month's disc.

Several of you pointed out the mistakes in the Hints & Tips listings. Listing 2 stops abruptly at line 470 while listing 3 is too long. Lines 480–850 in listing 3 do actually belong to listing 2.

Reference was made in the Joe's Jottings to a Carousel (listing 4) program on the yellow pages. Space was tight so here is the missing listing:

```
  10 MODE 2
  20 REPEAT
  30 *UNPACK robin
  40 PROCwait(10)
  50 *UNPACK bear
  60 PROCwait(10)
     ... ... ...
 990 UNTIL FALSE

1000 DEF PROCwait(t)
1010 LOCAL delay
1020 delay=TIME+t*100
1030 REPEAT UNTIL TIME>
=delay
1040 ENDPROC
```

We'll do better next month!

Competitions round-up

Acorn User's competitions are becoming so popular that thousands of you are entering each one. Because of this it sometimes take us a while to judge all these entries and send out the prizes to the winners.

Most popular of all was our February competition in which we asked you to make as many words as you could from the letters *Acorn User*. How some of you managed to make words more than nine letters long mystifies us and many hard hours were spent checking entries against our ancient dictionary.

With the grand total of 301 permissible words, Mr J Prinner of Millom, Cumbria will soon be receiving his Panasonic printer.

There were two winners of our January competition, in which the prizes were computer holiday weeks at Grendon Hall in Northamptonshire. They are Helen McQuillan from Wokingham, Berkshire, and R M Neal from Derbyshire.



Our winners will enjoy a week at Grendon Hall

Our December C competition remains to be judged owing to the number and quality of your entries. Results of that and other competitions will appear in next month's issue.

Winners will be notified by post with further details of their prizes as soon as possible.

More Arc software released

After its *Which Computer?* Show debut *1st Word Plus* is now on sale. Features included in the £102 price are a real-time (as you write) spelling checker and mail-merge, graphics and multi-windowing.

Two other programs due within the next few weeks are *Autosketch,* a CAD package originiating on the PC, and *Architext.* This second package, from Hopesoft, is not in fact a wordprocessor but a high-level language editing program.

POST A PROBLEM

Acorn User has a guaranteed fast reply service for enquiries. Your answer will be returned within 10 working days for just £3 (includes VAT), or your money back.

Just write out your problem, fill in the coupon (right), and send both off to *Acorn User* with a stamped addressed envelope and cheque or postal order for £3 made out to Redwood Publishing. If you want recorded delivery add the cost of this on. Include as much detail as possible, and a disc or cassette if a program is involved, with enough space to record any corrected listing.

Please note: debugging readers' programs or those from other magazines is a complex task and we cannot guarantee to give a full solution. Unless the problem can be spotted quickly, the service will only be able to make general comments or suggest a strategy for the reader.

We will answer the problem and return all material received – within a guaranteed 10 working days from receipt. If we fail to match this promise then your cheque or postal order will be returned with the answered question – you can't lose!

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ADDRESS ______

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Clares Micro Supplies, 98 Middlewich Road, Rudheath, Northwich, Cheshire CW9 7DA Tel: (0606) 48511
Creuzet Ltd, 108 Hawley Lane, Farnborough, Hampshire GU14 8HY Tel: (0252) 513211
Hewson, Hewson House, 56B Milton Park, Milton, Abingdon, Oxon OX14 4RX Tel: (0235) 832939
Human-Computer Interface Ltd, 11 Brunswick Walk, Cambridge CB5 8DH Tel: (0223) 314934
Hybrid Technology Ltd, Unit 3, Robert Davies Court, Nuffield Road, Cambridge CB4 1TP Tel: (0223) 316910
Jaybrooks, Woodside, Hadlow Park, Tonbridge, Kent Tel: (0732) 851438
Mitre Software Ltd, International House, Creechurch Lane, London EC3A 5BA Tel: 01-283 4646
Music View Ltd, 8 Wellington Close, Walton-on-Thames, Surrey KT12 1AX Tel: (0932) 242766
RBRC, Guild House, 32 Worple Road, London SW19 4EF Tel: 01-946 8641
Watford Electronics, Jessa House, 250 Lower High Street, Watford
Wild Vision, 6 Jesmond Road, Newcastle Upon Tyne, NE2 4PQ Tel: 091-281 8481

Education

Finding the addresses of educational suppliers and groups can be difficult. Here's a selection drawn from the database supplied by Nick Evans. Details of how to order the file are on page 143

4mation, Linden Lea, Rock Park, Barnstaple EX32 9AQ Tel: 0271 45566
AB European Marketing, Wharfdale Road, Pentwyn, Cardiff, CF2 7HB Tel: 0222 733485
Academic Software, Sourby Old Farm, Timble, Otley, W. Yorks. LS21 2PW Tel: 094 388 628
Advisory Unit, AUCBE, Endymion Road, Hatfield, Herts, AL10 8AU Tel: 07072 65443
BP Education, PO Box 5, Wetherby, W. Yorks. LS23 7EH Tel: 0937 843477
Bristol SEMERC, Polytechnic, Redland Hill, Bristol, BS6 6UZ Tel: 0272 733141
British Telecom Education Service, PO Box 10, Wetherby, W. Yorks. LS2 3EL
British Logo User Group, C.A.M.E.T., Univ. of Technology, Loughborough, LE11 3TU
Cambridge Micro Software, Edinburgh Building, Shaftesbury Road, Cambridge, CB2 2RU Tel: 0223 312393
Cambridgeshire Software House, Town Hall, St Ives, Huntingdon, PE17 4AL Tel: 0480 66805
Centre for World Development Education, Regent's College, Inner Circle, Regent's Park, London NW1 4NS Tel: 01-487 5474
Electronic Aids for the Blind, 28 Crofton Avenue, Orpington, Kent, BR6 8DU
Elfin Systems, Byard Road, Gloucester, GL2 6DF Tel: 0452 411533
Elsevier Biosoft, 68 Hills Road, Cambridge CB2 1LA Tel: 0223 68622
ESM, 32 Bridge Street, Cambridge, CB2 1UJ Tel: 0223 65445
Fernleaf, 31 Old Road West, Gravesend, Kent, DA11 OLH Tel: 0474 539037
GSN/MEMS, 214 Stamford Street, Aston-under-Lyne OL6 7LP Tel: 061 339 6635
High Level Algorithms Ltd, 12 Den Brook Close, Wellswood, Torquay, Devon, TQ1 3TP Tel: 0803 22092
Hybrid Technology, Unit 3, Robert Davies Court, Noffield Road, Cambridge, CB4 1TP Tel: 0223 316910
Inner London Education Computer Centre, John Ruskin Street, London SE5 OPQ Tel: 01-735 9123
Jessop Microelectronics, Unit 5, 7 Long Street, London E2 Tel: 01-729 1851
Kosmos, 1 Pilgrims Close, Harlington, Dunstable LU5 6LX Tel: (05255) 3942
Lego UK Ltd, Educational Division, Ruthin Road, Wrexham LL13 7TQ Tel: (0978) 266949
Logotron Dales Brewery, Gwydir Street, Cambridge CB1 2LJ Tel: (0223) 323656
College, Lincoln LN1 3DY Tel: 0522 44713
Microelectronics Education Support Unit, Advanced Technology Building, University of Warwick, Coventry, CV4 7EZ Tel: 0203 416994
Microvitec Ltd, Futures Way, Bolling Road, Bradford BD4 7TU Tel: 0274 390011
MUSE, PO Box 43, Houghton on the Hill, Leicester LE7 96X Tel: 0533 433839
National Econet Users Club, XOB, Balkeerie, Eassie, Forfar, Angus
NERIS, Maryland College, Leighton Street, Woburn, MK17 9JD
Newcastle SEMERC, Polytechnic, Coach Lane Campus, Newcastle upon Tyne, NE7 7XA Tel: 0632 665057
NORICC, Resources Centre, Coach Lane Campus, Newcastle Upon Tyne, NE7 7XA Tel: 091 270 0424
Open Tech Training Support Unit, 24-27 Prudential Buildings, Bar St, Southampton, SO1 OFG Tel: 0703 36429
Possum Controls, Middle Green Trad. Est., Langley, Slough, SL3 6DF Tel: 0753 79234
Prestel Education, Telephone House, Temple Avenue, London, EC4Y OHL Tel: 01-583 9811
Redbridge SEMERC, Dane Centre, Melbourne Road, Ilford, Essex IG1 4HT Tel: 01-478 6363
RESOURCE, Exeter Road, Doncaster, S. Yorks DN2 4PY Tel: 0302 63800
Rickitt Educational Media, Ilton, Ilminster, TA19 9HS Tel: 04605 5152
Sherston Software, 8 Court Street, Sherston, Malmesbury, SN16 OLL Tel: 0666 840433
Special Educational Needs Database, SCET, 74 Victoria Crescent Road, Glasgow, G12 9HN Tel: 041 334 9314
System, 12 Collegiate Crescent, Sheffield, S10 2BA Tel: 0742 682321
Tressell, Unit 3, 22 Campbell Road, Brighton, Susex, BN1 4QD Tel: 0273 600186
Unilab, Clarendon Road, Blackburn, Lancs, BB1 9TA Tel: 0254 57643

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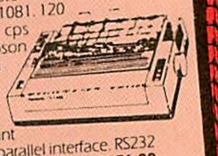
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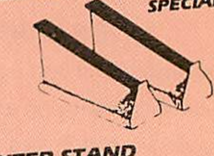
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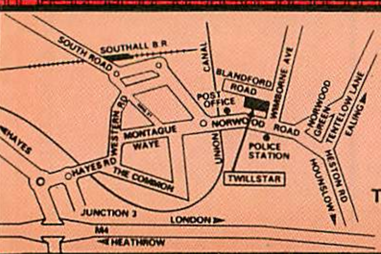
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READER SURVEY

Win an Archimedes



As a reader of *Acorn User* you have a vast influence on the content of the magazine – especially when you reply to the Reader Survey. Last year people from all over the world made their views felt, and three won Compacts. This year we've gone one better with an Archimedes and two Compacts, all three with colour monitors, to be won if you come up with good suggestions for a new series of articles.

We want to know who our readers are and what they think of the magazine. Ideas that have been taken up from past surveys include listings on Micronet, the Noticeboard, reader offers and special theme issues.

Survey answers will be compiled statistically, but each individual answer will be kept confidential. Please don't exaggerate – your replies have no influence on whether you win a micro.

You can send in a photocopy of the survey to save cutting up the magazine, but please don't send in more than one copy. Even if you don't own an Acorn micro, you can still fill in the survey, leaving out questions which aren't relevant.

For the best suggestion we've got one of Acorn's world-beating Archimedes micros waiting. The Archimedes 310 is one of the world's fastest micros, and certainly the fastest at the price. Our prize – a complete system worth over £1000 – features a colour monitor, 1Mb of RAM, built-in 3.5-inch disc drive and a BBC software emulator. Unpack it, plug it in, and away you go!

And for two runners-up, we've got BBC Master Compacts, complete with colour monitor and disc drive, each worth over £500. These are ideal for home and business and we have 40 of them on a company-wide network.

The winners will be notified by post, and their names published in *Acorn User*. The Editor's decision is final.

READER SURVEY

YOUR COMPUTER SYSTEM

1 What micro(s) do you own?
☐ 01 BBC model B
☐ 02 Electron
☐ 03 Master 128/B+
☐ 04 Master 512
☐ 05 Compact
☐ 06 Archimedes 305
☐ 07 Archimedes 310
☐ 08 Archimedes 410/440
☐ 09 RM Nimbus
☐ 10 Macintosh
☐ 11 Z88
☐ 12 IBM PC or compatible
☐ 13 None
☐ 14 Other ______

2 How many micros are there in your household?
☐ 01 0
☐ 02 1
☐ 03 2
☐ 04 3 or more

3 Which of the following do you own or hope to buy in the next 12 months?

Own	Hope to buy	
☐ 01	☐ 12	Disc drive
☐ 02	☐ 13	Printer
☐ 03	☐ 14	Monitor
☐ 04	☐ 15	Mouse/Trackerball
☐ 05	☐ 16	Second or co-processor
☐ 06	☐ 17	Shadow RAM board
☐ 07	☐ 18	Sideways RAM
☐ 08	☐ 19	Modem
☐ 09	☐ 20	Hard disc
☐ 10	☐ 21	Teletext receiver
☐ 11	☐ 22	Other

4 What do you mainly use your micro for?
☐ 01 Recreation/hobby
☐ 02 School/college work
☐ 03 Teaching own children
☐ 04 Preparing teaching materials
☐ 05 Home or personal affairs
☐ 06 Business
☐ 07 Club/society administration
☐ 08 Doing office work at home
☐ 09 Other ______

5 What are the top five applications you use your micro for?
☐ 01 Accounting
☐ 02 Arcade games
☐ 03 CAD/CAM
☐ 04 Communications
☐ 05 Computer terminal
☐ 06 Database
☐ 07 Data capture/research
☐ 08 Desktop publishing
☐ 09 Equipment control
☐ 10 Graphics/art/design
☐ 11 Home education
☐ 12 Music
☐ 13 Spreadsheets
☐ 14 Statistics
☐ 15 Teaching
☐ 16 Your own programming
☐ 17 Wordprocessing
☐ 18 Other ______

6 If you program, which of the following do you use?
☐ 01 6502 assembler
☐ 02 ARM assembler
☐ 03 Basic
☐ 04 C
☐ 05 Fortran
☐ 06 Logo
☐ 07 Pascal
☐ 08 Prolog/Lisp
☐ 09 Other ______

7 If you have a BBC or Electron disc system, which type is it?
☐ 01 5.25-inch 40-track
☐ 02 5.25-inch 80-track
☐ 03 5.25-inch 40/80-track
☐ 04 3.5-inch
☐ 05 Hard disc

And do you use:
☐ 06 ADFS
☐ 07 DFS or compatible

8 Which of the following do you have?
☐ 01 Basic 1
☐ 02 Basic 2 or later
☐ 03 A disc sector editor
☐ 04 *Fleet St Editor*
☐ 05 *InterSheet*
☐ 06 *InterBase*
☐ 07 *InterWord*
☐ 08 *Masterfile*
☐ 09 *Mini Office*
☐ 10 *AMSPagemaker/StopPress*
☐ 11 *Super Art*
☐ 12 *Ultracalc*
☐ 13 *View*
☐ 14 *ViewSheet*
☐ 15 *ViewStore*
☐ 16 *Wordwise Plus*

9 Do you use any of the following?
☐ 01 Electronic mail
☐ 02 Bulletin boards
☐ 03 User group,
☐ 04 BBC network (eg, Econet)

10 Has your micro ever needed repair?
☐ 01 Yes ☐ 2 No

11 Where do you usually buy your hardware and software?

Hard	Soft	
☐ 01	☐ 05	High street store
☐ 02	☐ 06	Mail order
☐ 03	☐ 07	Acorn dealer or special computer shop
☐ 04	☐ 08	Other

12 Please estimate your personal software spending over the past 12 months:
☐ 01 £20
☐ 02 £20-£49
☐ 03 £50-£99
☐ 04 £100-£299
☐ 05 £300-£499
☐ 06 over £500

13 and over the next 12 months?
☐ 01 £20
☐ 02 £20-£49
☐ 03 £50-£99
☐ 04 £100-£299
☐ 05 £300-£499
☐ 06 Over £500

ABOUT YOU

14 Are you ☐ 01 male? ☐ 02 female?

15 How old are you?
☐ 01 under 16
☐ 02 16-24
☐ 03 25-34
☐ 04 35-44
☐ 05 45-54
☐ 06 55 or older

16 What is your occupation?
☐ 01 Student at school
☐ 02 Student at college/university
☐ 03 Teaching/training
☐ 04 Research and development
☐ 05 Self-employed/small business
☐ 06 Health/welfare
☐ 07 Media/creative
☐ 08 Computing/electronics
☐ 09 Engineering
☐ 10 Other professional
☐ 11 Managerial
☐ 12 Admin/clerical
☐ 13 Manual/tradesman
☐ 14 Uniformed services
☐ 15 Unwaged
☐ 16 Other

READER SURVEY

17 Do you use another computer at work or college?
- ☐ 01 No
- ☐ 02 Acorn/BBC micro
- ☐ 03 IBM PC or compatible
- ☐ 04 Macintosh
- ☐ 05 RM Nimbus
- ☐ 06 Sun-type workstation
- ☐ 07 Other__________

18 How many micros are there at your place of work?
- ☐ 01 None
- ☐ 02 1-9
- ☐ 03 10-19
- ☐ 04 20+

19 Do you authorise expenditure on computers at work?
- ☐ 01 Yes
- ☐ 02 No

ACORN USER

20 How do you usually get *Acorn User*?
- ☐ 01 By subscription
- ☐ 02 Regular newsagent order
- ☐ 03 Buy it regularly
- ☐ 04 Read someone else's/school/library copy

21 For how long have you read *Acorn User*?
- ☐ 01 Less than 3 months
- ☐ 02 4-6 months
- ☐ 03 7-12 months
- ☐ 04 More than a year
- ☐ 05 Since 1982

22 How many other people read your copy?
- ☐ 01 None
- ☐ 02 1-3
- ☐ 03 4 or more

23 Which of the following do you buy/read regularly?

Buy	Read	
☐ 01	☐ 10	*Acorn User*
☐ 02	☐ 11	*A&B Computing*
☐ 03	☐ 12	*Beebug*
☐ 04	☐ 13	*Byte*
☐ 05	☐ 14	*Educational Computing*
☐ 06	☐ 15	*Electron User*
☐ 07	☐ 16	*Personal Computer World*
☐ 08	☐ 17	*The Micro User*
☐ 09	☐ 18	*Times Educational Supplement*

24 Do you read the advertising in *Acorn User*?
- ☐ 01 Some
- ☐ 02 Most
- ☐ 03 All

25 Have you brought mail order products from advertisements in *Acorn User*?
- ☐ 01 Yes
- ☐ 02 No

26 From whom would you order products by mail-order?
- ☐ 01 Any advertiser in *Acorn User*
- ☐ 02 Only regular *AU* advertisers
- ☐ 03 Only one of the well-known industry names

27 How do you rate the following features:

Good	Fair	Poor	
☐ 01	☐ 22	☐ 43	News
☐ 02	☐ 23	☐ 44	Noticeboard
☐ 03	☐ 24	☐ 45	Letters
☐ 04	☐ 25	☐ 46	First Byte
☐ 05	☐ 26	☐ 47	Step-by-Step
☐ 06	☐ 27	☐ 48	Hints & Tips
☐ 07	☐ 28	☐ 49	Archimedes Agora
☐ 08	☐ 29	☐ 50	Competitions
☐ 09	☐ 30	☐ 51	Technical features
☐ 10	☐ 31	☐ 52	General features
☐ 11	☐ 32	☐ 53	Joe's Jottings
☐ 12	☐ 33	☐ 54	Yellow pages
☐ 13	☐ 34	☐ 55	Hardware reviews
☐ 14	☐ 35	☐ 56	Software reviews
☐ 15	☐ 36	☐ 57	Business section
☐ 16	☐ 37	☐ 58	Education news
☐ 17	☐ 38	☐ 59	Education section
☐ 18	☐ 39	☐ 60	Network page
☐ 19	☐ 40	☐ 61	Free ads
☐ 20	☐ 41	☐ 62	Abuser's Diary
☐ 21	☐ 42	☐ 63	Reader service (if used)

28 Name the three best articles you have read in *Acorn User*
- ☐ 01__________ month__________ year__________
- ☐ 02__________ month__________ year__________
- ☐ 03__________ month__________ year__________

29 Number your top three preferences for expanding *Acorn User* services:
- ☐ 01 An *Acorn User* bulletin board
- ☐ 02 Phone enquiry service
- ☐ 03 Training courses organised by *Acorn User*
- ☐ 04 More *Acorn User* software
  Suggestion: __________
- ☐ 05 More reader offers
  Suggestion: __________

PRIZE DRAW

Finally to qualify for the prize draw, think up a name and idea for a three-part series of articles in *Acorn User*:

____

Fill in your name and address here and send it to: *Acorn User* Survey, **Redwood Publishing Ltd, 20-26 Brunswick Place, London N1 6DJ.** Forms should be returned by May 27 1988.

Name__________

Address__________

__________ **Postcode**__________

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Limited stocks	£43.95

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	~~£79.85~~
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	~~£124.85~~
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*BBC COMPATIBLE

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10 ORIGINAL HITS ON EACH
FANTASTIC VALUE

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12" GREEN SCREEN MONITORS (MM02)
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NEW

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The ROMPLUS-144 is fully buffered and has 8 sockets to hold either 8 ROMS or 7 ROMS plus a 32K RAM. The ROMs are individually software selectable via an additional operating system ROM supplied in the unit. The RAM is configured as 2 x 16K sideways ROMs, each of which can be loaded either from disc/tape or from other ROMs, for applications that require two ROMs simultaneously. The RAM can also be used as a RAM FILING SYSTEM or a PRINTER BUFFER.

Price Only £39 + £15 if RAM required

"Here at last is a true Mode 7 adaptor...and very impressive it is too." - *E.U., Aug. '87*
"A quality product well made...buy it." - *A.&B. Computing, Feb. '88*

ELECTRON MODE 7 ADAPTOR

As reviewed in this issue

Full hardware implementation gives the Electron a true MODE 7 display.
1K screen, direct character pokes, full teletext character set, full colour.
Compatible with Wordwise Plus.
Compatible with Prestel/Micronet and Teletext (Ceefax/Oracle) adaptors..
Compatible with long MODE 7 adventure games,
TV and RGB outputs.
Screw-in case fits between Electron and Plus One and protects connectors.
Available as a kit - bare ROM parts list and layout.

Prices: Full Unit - £89, Kit - £25+ £10 for case

Still available -

The Original E2P Second Processor Kit

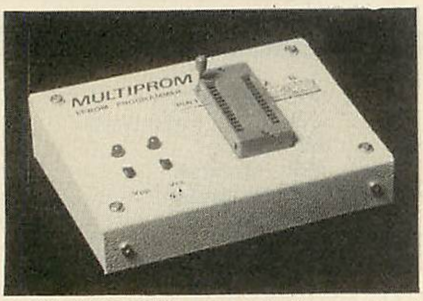
Bare pcb, instruction booklet, software on cassette, 3.5" disc or ROM
"An excellent add-on" - *A.&B. Computing, April '86*

Prices: With software on cassette - £15, 3.5" disc or Rom - £20

ALL PRICES ARE INCLUSIVE OF POSTAGE, ETC.
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MULTIPROM EPROM PROGRAMMER



The MULTIPROM EPROM programmer, based on our very popular UVIPROM design, has the following Hardware Features:-

- Programs 2764,27128,27256,27512,27513 & 27011 EPROMs, including "A" & CMOS types.
- Plugs into user port on BBC B, 128 or Master.
- High quality Textool ZIF socket.
- ZIF can be powered down.
- Quick setting of EPROM type using DIP switches.
- Custom made aluminium case in textured cream colour.

The UVP 1.1 ROM contains:-

- Fast or slow programming algorithm.
- Hex & ASCII screen display.
- Five * commands for blank check, read, blow, view buffer & compare.

Prices: **MULTIPROM plus UVP 1.1 ROM**

£45.00

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- Very compact 90 x 80 x 40mm plastic case.
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Prices

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Basic 8/16K programmer. For 12.5 volt EPROMS, Programs all 'A' Suffix and CMOS types. Including UVP1.1 Software. While stocks last. **£20.00.**

COMING SOON

New UVIPROM 8/16/32K programmer, 21 or 12.5 volt. Fully cased with ZIF Socket and Software. **£30.00**

Type		1–2	3–9	10 up
EPROMS	27C128-25	**£4.00**	**£3.70**	**£3.50**
	27256-25	**£5.00**	**£4.90**	**£4.60**

Both type require 12.5 Volts Vpp
S.A.E. for details of Uviprom conversion 21 Volts to 12.5 Volts datasheet

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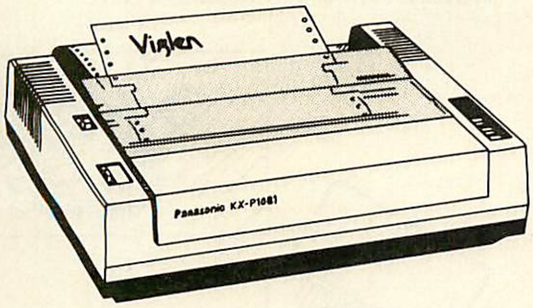
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Educational and Government orders welcome.

SPECIAL OFFERS FROM VIGLEN

PANASONIC PRINTER KIT



The Panasonic KX-P1081 come complete with £45.00 worth of accessories FREE including tractor feed and roll feed units with paper, printer cable, and a specially designed metal printer stand.
Features include:

- ★ 120 cps draft printing 24 cps NLQ
- ★ IBM and Epson compatibility through dip switch settings
- ★ Prints 80 coloumns on A4 cut sheets, continuous stationery or roll paper 9 × 9 draft and 18 × 23 NLQ

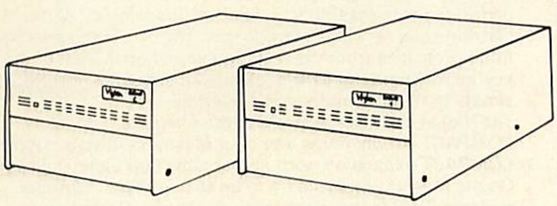
Stock Code	Description	Price inc. VAT
SP079	Panasonic KX-P1081 plus accessories	£185.95

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WINCHESTER

MEGA BYTES FOR MINI BUCKS

NEW LOW PRICES



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Drive 1 Winchesters are also available for backup or just more storage and simply plug into the back of the Drive 0 unit.
The Winchester package consists of: Winchester unit (cased with controller boards, power supply and fan), Master reference Manual part 1, Winchester user guide and Winchester utilities on disk (such as formatter, verifier, ADFS menu and sophisticated backup program allowing you to make fast backups on DFS disks, ADFS disks or Drive 1 Winchester).

Stock Code	Description	Price inc. VAT
Drive 0 Single		
SP0150	VB20 20Meg Viglen Winchester	£499.00
SP0152	VB28 28Meg Viglen Winchester	£519.00
V155	VB40 40Meg Viglen Winchester	£799.00
V156	VB56 56Meg Viglen Winchester	£899.00
Drive 1 Second Drive		
SP0160	VB120 20Meg Drive 1 Winchester	£479.00
SP0162	VB128 28Meg Drive 1 Winchester	£499.00
V165	VB140 40Meg Drive 1 Winchester	£739.00
V167	VB156 56Meg Drive 1 Winchester	£769.00
V157	20MB Tape Streamer Backup	£689.00
V503	Acorn ADFS Rom and Manual (Only necessary for BBC B or B Plus)	£29.95

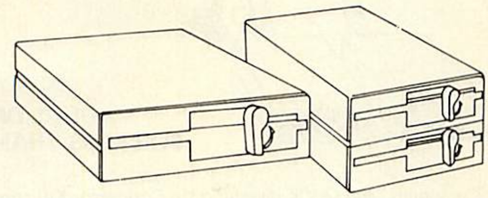
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Available for use with SJ research file server at no extra cost, please specify when ordering.

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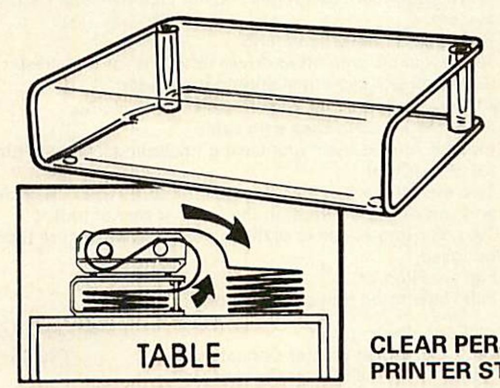


All disc drives are supplied with a manual, packed utilities disc and a full 12 Months warranty (2 Year Warranty available) and are ready to plug in and use on a BBc B (fitted with a DFS) B + or Master micro. 40/48 Track drives have a switch which enables operation in either 40 or 80 track mode.
The capacity quoted are given in single density mode; for double density mode (1770 DFS + ADFS as in the Master) the capacities should be approximately doubled.
An integral power supply is not necessary as the disc drives run from the micro's power source however should you require drives with their own power supply, these are also available.
If your BBC B micro does not have a DFS fitted then you will also require the Acorn dfs kit. These are available from Viglen.

Stock Code	Description	Price inc. VAT
SP014	400K Single Drive 40/80T	£99.95
SP030	400K Single Drive 40/80T + PSU	£109.95
SP019	800K Dual Drive 40/80T	£189.95
SP020	800K Dual Drive 40/80T + PSU	£209.95
VPD0240	100K Single Drive	£105.95
VPD0241	400K Single Drive 40/80T	£113.00
VPD0242	200K Dual Drive	£195.95
VPD0243	800K Dual Drive 40/80T	£219.00
VPD0245	100K Single Drive + PSU	£119.95
VPD0246	400K Single Drive + PSU	£135.00
VPD0247	200K Dual Drive + PSU	£209.95
VPD0248	800K Dual Drive 40/80T + PSU	£235.00
VPD0249	800K Dual Drive 40/80T + PSU in Metal Bridge Unit	£265.00
V0060	3.5" 400K Single Drive	£95.95
V0061	3.5" 800K Dual Drive	£199.95
V0062	3.5" 400K Single Drive + PSU	£135.00
V0063	3.5" 800K Dual Drive + PSU	£199.00
V0064	3.5" and 5.25" 800K Dual Drive	£219.00
V0065	3.5" and 5.25" 800K Dual Drive with PSU	£249.00

Please add £8.00 for insured courier delivery.

PRINTER STANDS



CLEAR PERSPEX PRINTER STAND

The Viglen printer stands are beautifully finished in clear perspex and raise the printer high enough to put continuous stationary underneath.

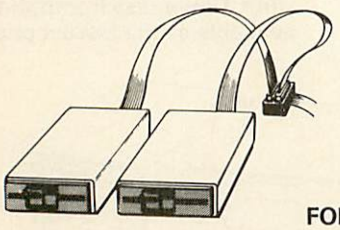
Stock Code	Description	Price inc. VAT
V490	80 Column Printer Stand (15" × 13" × 3.5")	£19.95
V491	136 Column Printer Stand (23.5" × 13" × 3.5")	£29.95

Please add £3 P & P

ORDER FORM ON LAST PAGE OF VIGLEN SECTION

SPECIAL OFFERS FROM VIGLEN

DUCKS



DUAL DRIVES FOR LESS THAN £17!

The Viglen Data DUCK (Dualling Up Connector Kit) converts any two single drives to a dual drive instantly. Simply plug the duck into the micro's disk drive socket and plug two single drives (any type and any make) into the duck to obtain a dual drive system accessed as drive 0 (and 2 if double sided) and drive 1 (and 3 if double sided). If neither single drive has its own power supply then you will require a Viglen power DUCK in order to obtain two disk drive power sockets from the micro.

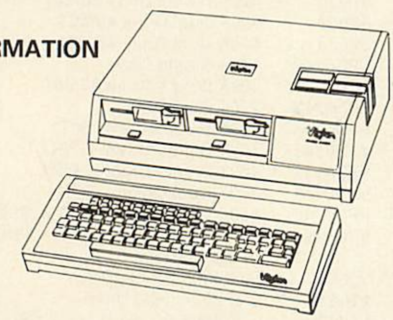
★ No soldering simply plugs in.
★ No need to take disk drives apart to change links.

Stock Code	Description	Price inc. VAT
V084	Viglen data duck	£16.95
V085	Viglen power duck	£7.95

Please add £2.50 for P & P.

CONSOLE SYSTEM

MASTER TRANSFORMATION



Give your BBC Master micro the professional PC look by replacing your existing lid with this smartly styled package. The system is strong and constructed in high impact ABS colour matched to the BBC Master and it gives your Master a very neat and impressive look.

★ Will support monitors including up to 16" TV.
★ Can house two 5¼" disk or Winchester drives.
★ Capable of housing 3½" drives.
★ Will accept Acorn cartridges and the Viglen Master Cartridge system.
★ Full internal metal screening.
★ Also available with fitted drives (5¼", 3½" or Winchester) or as a complete system including the Master.

The Master console unit system packages includes:

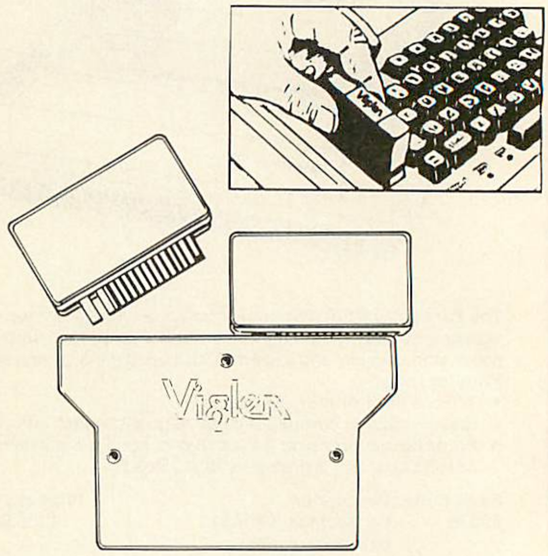
★ Remote Keyboard case with cable.
★ Metal screened main unit casing (including internal fittings for 5¼" drives).
★ Two switches which can be used for 40/80 track switching and can be either fitted on the front or rear of unit.
★ Two blanking plates to blank out any drive aperture that is not used.
★ Full labelling kit.
★ Fully illustrated fitting instructions.

Stock Code	Description	Price inc. VAT
V861	Viglen Master Console unit	£59.95
Accessories for the Master Console unit		
V853	Dual Drive data cable for console unit	£9.95
V854	Dual Drive power cable for console unit	£7.95
V855	Power supply for the console unit	£34.95
V866	Fan Kit for console unit	£34.95
V858	Fitting bracket for 3½" drive	£8.95
V851	Viglen Professional Console Unit for the BBC micro	£49.95
	Fitting service available from	£15.00

Please add £8 for insured courier delivery.

CARTRIDGE SYSTEM

VIGLEN ROM CARTRIDGE SYSTEM



Having fitted the Viglen Rom cartridge system to your BBC, Master or Master COMPACT, you can plug in your Roms/Eproms simply by inserting each one in a Viglen cartridge and plugging in whichever cartridge you want to use. The same Viglen cartridge can be used on all the micros mentioned and there is no need to switch the micro on and off between cartridge changes.

The Viglen cartridge system for the BBC micro consists of the cartridge cable assembly and socket, blanking off plates, 1 cartridge and cartridge storage rack. The cartridge socket when fitted protrudes from the rectangular slot on the left of the keyboard where the cartridges are subsequently inserted. It is simple to fit and requires no soldering.

The Viglen cartridge system for the Master and Master COMPACT simply plugs into your Master cartridge slot (or COMPACT expansion port) and accepts two Viglen cartridges. On the Master you can plug in up to two Viglen cartridge systems thus giving you access to 4 Viglen Cartridges simultaneously. The system comes complete with 2 cartridges and cartridge storage rack. On the Master you can also use Viglen cartridges which have 32 and 64K paged Roms inserted.

Stock Code	Description	Price inc. VAT
V560	Viglen Rom cartridge system for BBC	£12.95
V559	Viglen Rom cartridge system for BBC (low profile)	£12.95
V550	Viglen Rom cartridge system for Master	£14.95
V551	Viglen Rom cartridge system for COMPACT	£14.95
V561	Single Viglen cartridge	£3.45

Please add £2.50 P & P (£00.50 for single cartridge).

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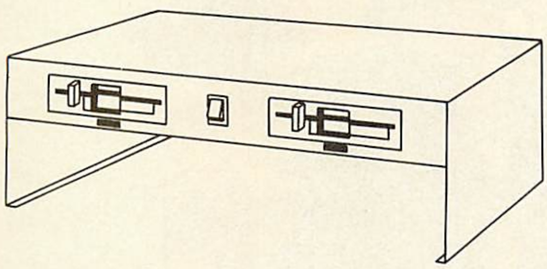
ORDER FORM ON LAST PAGE OF VIGLEN SECTION

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BRIDGE UNIT**

SPECIAL OFFER
£229.95 INC VAT



★ FRONT PANEL SWITCHING
★ 800K DUAL DRIVES 40/80T WITH PSU

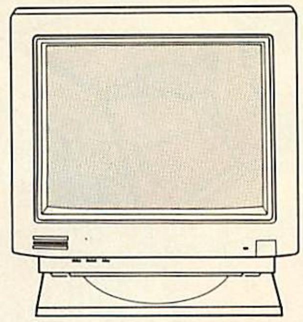
Direct disk drives are manufactured to the highest standard using high quality Japanese mechanisms. All drives are supplied complete with user manual and utility diskette.

Stock Code	Description	R.R.P.
SP0249	800K Drive in Bridge Unit with PSU	£229.95

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COLOUR MONITOR

★ A VERY SPECIAL OFFER ★



A High Resolution Colour Multiscan Monitor for only £343.85 inc VAT.

Just look at the following features:

★ Can run modes 18–20 on the Archimedes
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★ Manufactured in Japan by Fujitsu
★ 14" High Resolution Non Glare screen .31mm dot pitch
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★ Swivel base included
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★ Also 100% Compatible with IBM PC/AT CGA/EGA/PGA/VGA.

Stock Code	Description	Price inc. VAT
VA079	Fujitsu General ME-503 Colour Monitor	£343.85

Please state cable required for Archimedes, Master or BBC B.

Please add £8.00 for insured Courier Delivery.

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* Tick one please.

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Split-screen action with different views for each player. When you are both in the same area the views are the same.

Crack the code to the forcefield, pass through the portals to raid the area of valuable credits, then head for the lift.

Now *TWO* can play – and experience . . .

THE CHALLENGE OF A LIFETIME!

Starship Icarus is plummeting towards the sun, and the only hope of averting the impending cataclysm is for you to teleport on board, disable the master computer and regain control . . .

This spectacular fast-action game has a unique split-screen which means that one player can complete the game on his own – or play simultaneously with a friend – to fight the trigger-happy droids which infest the ship. With 20 levels of nerve-racking excitement, forcefields, mines, electronic doors, emergency lifts, movable walls, and opportunities to build up your armour, blaster and health ratings, this is one game you won't complete in a few weeks!

There can be no doubt that Icarus, with its incredible one- or two-player action, is one of the most exciting games ever created for the BBC Micro and Electron.

Check it out for yourself – and take up the challenge!

Icarus is the result of six months' intensive work by Powerhouse Software, the programming team which developed the top-selling Dunjunz. A full three months has been spent play-testing and fine-tuning to produce an addictive challenge with a gameplay that's really out of this world!

Available from all good stockists or order direct by sending a cheque or postal order made payable to Mandarin, together with your name and address. Access or Visa owners: Phone our hotline or send your card number with your order. Price include P&P.

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LETTERS

Write to Letters, Acorn User, 20-26 Brunswick Place, London N1 6DJ

THROUGH THE WINDOW

Sir, I have used Chris Adie's program from the March issue of *Acorn User*, which demonstrated using the Archimedes' built in window manager, with much success. I soon modified it to display text. Writing a new procedure for each window became tiresome, especially as I already had most of the information in *View* files. Here is a general procedure I have written for printing a text file in a window:

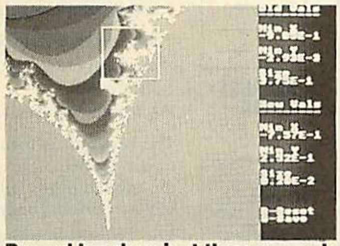
```
  DEF PROCreadfile(f$,
x0%,y0%)
  LOCAL c%,ch%,x%,y%
  x%=x0%:y%=y0%+1000
  c%=OPENIN(f$)
  REPEAT
  ch%=BGET#c%
  IF ch%=13 THEN
  x%=x0%:y%-=35
  ELSE x%+=20:MOVE x%,
y%:PRINT CHR$(ch%)
  ENDIF
  UNTIL EOF#c%
  CLOSE#c%
  ENDPROC
```

To call this procedure to print a file called 'text', simply modify the functions for circles, ellipses and rectangles thus:

```
  DEF FNtext(x0%,y0%)
  PROCreadfile("text",
x0%,y0%)
  =0
```

Mark Burch
Cornwall

There was lot of interest in Chris Adie's article on the Arc's window manager, and we are planning other articles on the window manager by Chris in a forthcoming issue. We aim to cover the use of pull-down menus and icons in the future.



Record breaker: just three seconds

FASTER THAN A SPEEDING. . .

Sir, I was very interested to see your article 'Mandelbrots in Moments' in the March issue. It states in the article that someone could probably knock a few seconds off your time of 28 seconds. I have written a program that takes just three seconds. This compares with about four minutes on the Atari ST.

Stephen Streater
King's College, London

Stephen's Mandelbrot program is included on this month's 3.5-inch disc – see page 15 for details of how to obtain the disc.

TOUCHSCREEN ERRORS

Sir, In your roundup of educational software for the Microvitec Touchscreen, there were a couple of errors. The Arrowsoft program referred to as *Look Alive* is in fact called *Look Alike*.

The quoted price of £10.50 is for the supply of single discs. The bundled pack costs £20 for three discs.

Richard Ogeley
Arrowsoft

ART CRITICISM

Sir, I teach art in a comprehensive school and have been able to introduce the pupils to the various software available.

When *Microbrush* was advertised, I invested in a two-ROM system. I was amazed at the facilities offered! Tony Quinn points out in his review in the December 1987 *Acorn User* there is nothing better for the BBC machine. But I have to disagree with much of his criticism. Having spent a lot of time with similar packages I found *Microbrush* very easy to get into at its bottom level. Here, the routines are straightforward enough to anyone who has used art packages before.

After only two hours, I felt really at home with the whole system, and was beginning to regret not having bought the third ROM.

I have not experienced some of the problems he mentioned regarding overlapping text and overwriting files. I agree that *Microbrush* would benefit from an undo facility, but there is an excellent selective colour rubber available from the menu.

What grieves me most is what Tony fails to mention about *Microbrush* – the superb zoom shape routine or the programmable special effects. I could go on.

I have many 14- to 18-year-olds using the system without much instruction. In most cases it is difficult to get them to use anything else.

J Lowery
Newcastle-upon-Tyne



Seattle Space Needle

SPACE NEEDLE

Sir, A short note with regard to your spot the difference competition in the March issue of *Acorn User*. Although I am unable to tell you who produced the 'masterpiece', I can tell you where it is.

The tower on the left of the picture is the Space Needle in Seattle; a left-over from the World Fair held in the Sixties.

Graeme Sanders
Lewes

GAMES NEEDED

Sir, My disabled wife recently obtained a BBC Master. She suffers from multiple sclerosis and her only voluntary movement is of her head. I have written to several companies requesting a list of suitable games but without success. Can any of your readers help?

F M Neale
Coventry

EXTRA ROMS

Sir, At present I have a Watford DFS 1.44 and Watford dual disc drives. I also have *Disc Doctor* and *Novacad* ROMs fitted and therefore have no spare ROM sockets left on the PCB.

I wish to add a printer and the Watford *Dumpout3* ROM to my computer. My problem is which ROM expansion board to buy, bearing in mind I wish to start wordprocessing on a more serious level. I am keen to stick with Watford for compatibility.

P Comber
West Sussex

Watford's solderless sideways ROM board would be ideal for your purposes. This would add another 12 extra ROM sockets to your computer. In addition, the 32k shadow RAM board would be useful to increase the amount of memory available when wordprocessing. This board can also be configured as a printer buffer; useful for when printing out long documents.

GRAPHICS BONUS?

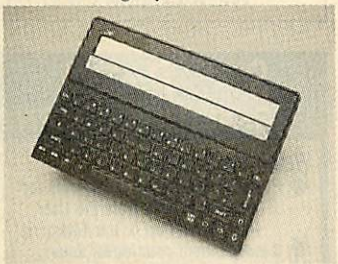
Sir, I own a BBC B microcomputer and have acquired a Brother HR5 printer. I would like to know if it is capable of printing graphics. Unfortunately I do not have a manual, so can only figure out the basic functions of the printer. Are there any commands which would enable me to do this?

Paul Winn
Taunton

The Brother HR5 printer is capable of printing graphics as it supports normal and double-density graphics. The majority of printers are controlled by Escape code sequences; sets of characters sent to the printer to set various functions such as enlarged text. An explanation of Escape code sequences was given in Hints & Tips August and September '87, and a table in the September issue showed most of the Escape codes that apply to the Brother HR5.

INTELLIGENT SINCLAIR

Sir, Full marks for the Z88/BBC file transfer program printed in your January issue, which has proved very useful in expanding the capabilities of my Z88. This falls squarely into the 'best thing since sliced bread' category.



Z88 can think

Z88/BBC users may be interested to know that the three artificial intelligence programs from the March '87 issue of *Acorn User*, *Eliza*, *Gus* and *Lear*, will all run on the Z88, with the MODE statements at the beginning removed.

Are there any other programs that would be suitable?

Neil Harris
Cardiff

As the Z88 uses BBC Basic, some of the programs published each month could work on the Z88, but graphics-based listings, and ones using star commands won't work.

We hope to start a Z88 column in the yellow pages, including compatibility table, in the near future.

SHORT CIRCUIT

Sir, I have had trouble using an Epson LX-86 printer with Joe Telford's PCB design program from the December '87 issue of *Acorn User*.

When printing out the designs, the vertical spacing of the drawing is incorrect, and therefore the spacing between pads is too small. This creates all kinds of difficulties when trying to use ICs with more than eight pins as when you have made the board the pins simply will not fit the pads.

J Clyde
Hartlepool

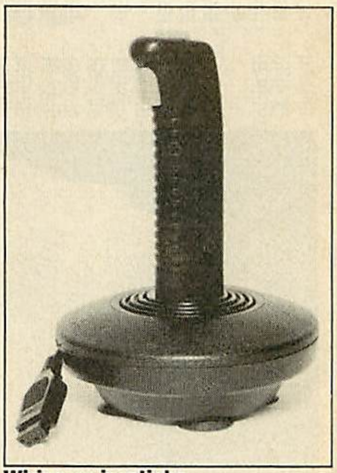
It is possible that the dump in the program will not work correctly with all types of printer. If this is the case, you should substitute another dump, preferably one written specifically for your particular model of printer. PROCdump (lines 5030-5400) is where the changes should be made to the program.

ABOVE AVERAGE

Sir, With reference to your letter from Victor Issacs in the March issue of *Acorn User* , it may be of interest to your readers to learn that our cricket club publishes a 'Cricket Averages' program. This includes exactly the type of database that Mr Issacs requires. The program costs £20 and is available from us at the following address:

General Secretary,
Old Isleworthian's Cricket Club,
9 Stanleycroft Close,
Isleworth,
Middlesex TW7 4LG.

G Hollocks
Middlesex



Wiring up joysticks

HOTSHOT JOYSTICKS

Sir, I own a pair of 'Professional Hotshot' digital joysticks and have had difficulty in finding out how to use them on my BBC B. I would be very grateful if you would advise me on how to use joysticks in my own programs.

C Wright
Hythe

There is a short program and details of a connecting cable for using digital joysticks via the user port in the March issue's Acorn Forum.

MONITOR CONVERTED

Sir, Could you please help me locate a multi-channel monitor to TV converter for use with a Microvitec 1451 AP RGB + PAL + AUDIO monitor.

B Woodgate
Uxbridge

Display Electronics markets a monitor to television converter called Telebox 2. Its address is:

Display Electronics,
32 Biggin Way,
Upper Norwood,
London SE19 3XF.
Tel: 01-679 4414

HINTS & TIPS

BANNER HEADLINES

As Hints & Tips changes hands, there's advice on printing banners, text formatting and hiding DFS catalogues, to name just a few

David Atherton

Starting this month, Hints & Tips is changing hands. Our thanks to Martin Phillips for his long stewardship of the column. He'll now be concentrating on advising and training teachers on the use of computers in schools but will still be writing occasionally for *Acorn User*. Taking over from him is the author of Acorn Forum, David Atherton.

Contributions to the new Hints & Tips column are most welcome. Submissions are preferred on paper *and* disc (which will be returned), and should be sent to David Atherton, Hints & Tips, *Acorn User*, Redwood Publishing, 20-26 Brunswick Place, London N1 6DJ.

£5

BANNER PRINTING

Starting off with a printer theme for this month's hints, Kieran Connell from Hull has produced a banner program which will print out a message in giant letters on almost any printer which accepts continuous paper. There's no need for the printer to be Epson compatible, as the printing is done using text only.

The program, listing 1 on the yellow pages, is fairly short and neat. It works by taking a string one character at a time. It reads the definition of the character with Osword 10, a call to an operating system which uses a parameter block (an area of memory), to store its results.

All Osword calls work by setting the X and Y registers to the address of the parameter block. Addresses on the Beeb consist of two bytes, and the X register is set to the low byte, and Y to the high byte. In Kieran's program he has used location &70 for the block. So X is &70 and Y is zero. You don't have to use a zero page location, but this is a good place as it's a memory area not used by Basic.

Note that in the program, the Osword call assigns Basic variables X% and Y%. Doing this before a CALL on USR statement sets up the values of the X and Y registers immediately before the machine code call is made.

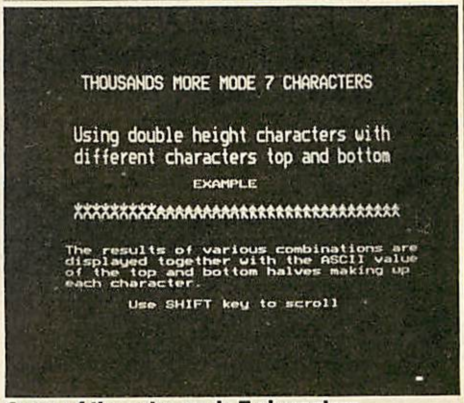
Osword 10 works by placing an ASCII code in the first byte of the parameter block, then making the call – which from Basic is always CALL &FFF1. After the routine has finished, next eight bytes of the block, in this case &71 to &78, are filled with bytes representing the pattern of the character. The bytes follow the same format as those used in the VDU 23 statement which defines new characters, and a side effect of the program is that if any characters are re-defined then the banner will show their re-defined forms. Some re-defined character sets were covered in Acorn Forum in recent months.

When the definition is known, each byte in the parameter block represents a row of eight pixels making up the shape of the character. The first is the top row, the second is the second row and so on. The program therefore needs to separate out the individual bits from each byte of the data, and this is done in a loop. The blocks printed consist of '#' characters although this can easily be changed by altering the ASCII character in quotes used in the setting of b$. If your printer has a solid block character, perhaps in the range 128-255, then you can change the program to use this one. If you can't just type the relevant code, use the CHR$ function, for example b$=CHR$ 255.

The program allows for magnification from 1 by 1 to 9 by 9, and the vertical and horizontal magnification may be different. Kieran found that 3 by 6 or 4 by 8 gives the best results. To use the program, switch your printer on and follow the prompts, giving the text string, followed by the magnification. Printing will them commence. You might like to improve the print quality by inserting the relevant codes for bold type, and so on, immediately after the line starting DEFPROCsideprt.

£5

EIGHT THOUSAND PRE-DEFINED CHARACTERS



Some of the extra mode 7 characters

Did you know that mode 7 offers you over 8000 extra characters? J K Darby of Lichfield makes this bold claim – and he's provided a program to show them all. It's a bit of a trick really, but what he has done is to exploit a feature of the mode 7 teletext display chip, which is that when using double-height displays, different characters can be used on the top and bottom lines. So you can get different bottom halves for each of the 95 top half characters. Obviously the vast majority of these strange combinations have no conceivable use, but there are certainly a few dozen interesting ones which appear as you watch the variations unfold, for example the little stick people shown in the picture.

When you run the program, the display cycles through every possible option. If you want to study the output, pressing CTRL-N for paged mode output, ie, Shift to move on a page, will work. Note that if you find the ideal character for your mode 7 output, then you'll only be able to reproduce it on a double-height line. Another problem is that you can't print them out either, as even mode 7 screen dumps don't actually read the screen, but just make assumptions about what the characters ought to look like.

£5

ELECTRONS ARE BETTER

'At last!' says Michael Stirling, from Hounslow, 'something that the Electron can do that the BBC B cannot!' Michael reports that the Master 128 has an extension to VDU 23,1 command. Normally VDU 23,1,0;0;0;0; turns off the cursor. If the third parameter is 2, the cursor goes from blinking to steady. The full syntax from Basic is:

```
VDU 23,1,2;0;0;0;
```

This is only implemented on the Electron and the Master series. The effect can be achieved on the BBC, but with a more complex command that re-programs the display chip:

```
VDU 23;10,7;0;0;0;
```

Change the 7 to 18 if in mode 7. The correct use of semi-colons and commas is very important.

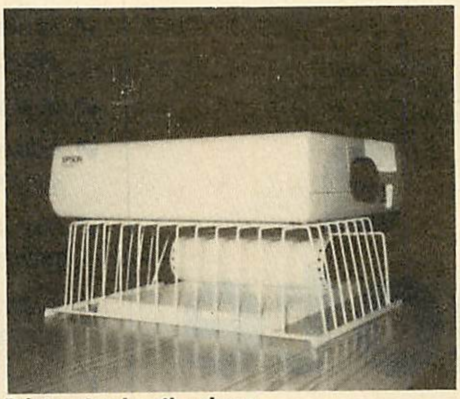
Actually, I found some interesting things about the improved Electron OS when I was preparing a list of machine differences. For example, the ROM polling system on the Master, which allows you to write ROMs which perform a background task – screen snapshots, clocks in the corner of the screen and the like – is supported on the Electron too, but not on the model B. Unique to the Electron is a special command, *FX115,1, which temporarily blacks all screen colours, and *FX115,0 which restores them.

£5

CHEAPER PRINTER STAND

A C Skinner of Blackpool offers advice on the subject of printer stands for those with small desks and small pockets. These devices raise the printer up, letting you stack fan-fold paper underneath. He has found that a Babatex wire tray (stocked in DIY stores) will make an excellent stand under which to stack paper if you turn it over and take off all the wire clips. Mr Skinner paid the princely sum of £2.99 for his 34x24cm stand, which must make it the cheapest stand around.

This reminds me of another possible source of such a stand. If, like many people, you made a wooden plinth for your original BBC, but have since moved on to a Master, or plinth disc drives, you'll often find that the old plinth can be pressed into service as a printer stand.



Printer stand on the cheap

£5

REMOTE CONTROL

Michael Johnson of Stoke Newington, London, commenting on John Allen's Z88 file transfer article in the January 1988 *Acorn User*, has some useful tips.

The BBC micro's keyboard can be controlled by a remote computer with the single command *FX2,1. After typing this, the main Beeb keyboard goes dead, except for the Escape key, and anything typed at a remote keyboard, say a Z88 or in Michael's case a Tandy 100, will appear as if it were typed on the BBC. Of course the two machines do need to be cabled together. If you use full duplex comms software on the portable machine, you might also type *FX3,1 on the portable – this will make your typing appear on the portable micro's screen too.

Michael manages to transfer *Wordwise* text to and from his Tandy without any BBC comms software. He does have such software on the Tandy, but this is built in as it is on most portables. After cabling up the machines, this is what he does.

BBC to portable:

- Don't disable the keyboard. Go into *Wordwise*
- Tell BBC it has a 300 baud serial printer with *FX8,3
- Set the portable terminal software to receive an ASCII file at 300 baud
- Tell BBC to print the file
- Tell portable to stop receiving and close incoming file

Portable to BBC:

- Go into the *Wordwise* command screen. Clear text area
- Tell BBC it has a 300-baud keyboard: *FX7,3 followed by *FX2,1
- Press Escape on BBC to enter text mode
- Set portable to send ASCII file at 300 baud, and send file

After file send, type *FX2 on portable followed by Return. This returns control to BBC keyboard. The file is in *Wordwise*. Michael found two snags.

One is that the portable does not have RS232 handshaking. This means that neither computer can tell the other when to stop sending for a moment while it deals with the characters it has already received. 300 baud is slow enough so that both machines can handle every character at the speed they come in.

The other is with Returns and Tab characters. If a file is printed out for transfer to the portable, extra carriage returns are 'added' as the line length is reached, although for further editing, they aren't required. Also, Tabs are expanded into multiple spaces. Michael suggests that each Return or Tab in the text is replaced with a normal printable character prior to transfer using search and replace. *Wordwise* allows you to replace Tabs and Returns using IT and IR with search or replace.

Note that this method is only suitable for sending text files. Full binary files such as machine code programs, formatted text, and program data files need to be transferred using proper communications software at both ends.

£5

TEXT FORMATTING ROUTINES

Rob Anderson from Middlesbrough has provided some Basic procedures for text handling which could be very useful if your program prints a lot of text on screen, or for that matter to the printer. Wordprocessing programs normally offer four options for displaying text – left-ranged or 'ragged right', right-ranged, justified at both margins, and each line centred. This program takes a line of text, up to 255 characters long, and outputs it as a paragraph which is formatted in the desired way. The line length can also be specified, as can the start and end positions. Paragraphs can begin with an indent, including a hanging or reverse indent. The routine doesn't supply a left margin as well, although you can, of course, add this in to the procedure. As an alternative method Rob recommends that this could be handled by using a text window.

The core of listing 3 in the yellow pages is a procedure, PROCformat, which takes four parameters – the indent (positive or negative), the line length, the target string,

and the style, which is given as 'RIGHT', 'CENTRE' or 'JUSTIFY'. Anything else is treated as ordinary left justification. To use the routine, call the procedure with the first parameter set to the indent you require, including a negative number for a hanging indent. The value passed should be zero if no indent is required. The second parameter is the line length, which must not exceed the screen width (or the window width if a text window is set). If a hanging indent is used, you should add the indent amount to the line length when calculating whether it will fit. The string to be printed should be continuous text with-



Text formatting options

out any Returns or other control characters, and finally the style is given as one of three text strings. Calling the procedure prints out successive lines of text in the desired format.

Rob suggests the instructions for a program or a text adventure game as possible uses. The routine generates and outputs any extra spaces necessary, so that routine could even be used as a part of a simple wordprocessor, or perhaps a label printer.

Note that each formatted paragraph must be supplied as a Basic string, restricting the paragraph size to a maximum of 255 characters. Maybe you could alter the program so that it works on a block of memory instead, allowing larger paragraphs to be formatted.

Note that there are some subsidiary procedures PROCprintbigword, PROCprinline, PROCalignright, PROCcentre and PROCjustify, which must be present if you want to incorporate the routine into your own program.

An important point about this routine is that it is entirely written in BBC Basic, without specific memory addressing, and so it should run on any machine running that language, including the Archimedes and Z88.

£5

HIDING DFS CATALOGUES

How often have you been working on your latest literary masterpiece when, while you were out of the room, someone had examined your discs and read your work? How can you protect your files from prying eyes without the need for fancy messing around with the disc format? This question is often asked, and whereas the method is straightforward technically, it's not that easy to do.

Stuart Rogers from Preston presents a neat little pair of programs which will hide all the files in catalogue, or show them again. After running Stuart's first program, a disc will appear to be blank when catalogued. The second program restores all the files, which are then revealed with *CAT. Other commands work normally, ie, *INFO still shows the filenames, and most importantly *LOAD, *EXEC, etc, can still access them.

The program works by using a little-known feature of the DFS, which is that if the first character of a filename has its top bit set (that means that 128 is added to the ASCII code for the character) then *CAT will not list that file. However, other sections of the DFS, such as those dealing with loading files, ignore this top bit, and will identify a character anyway – if either ASCII code 67 or 195 is read, the DFS still assumes it to be 'C'.

The Basic program in the yellow pages generates and saves two machine code programs. The first one, HIDE, is used to hide all files on the disc. Type *HIDE followed by the drive number. All the files present at that time will disappear from the catalogue. The second program, SHOW, is invoked with *SHOW and the drive number. If you omit the drive number, then drive 0 is assumed.

On a Master 128, *SHOW is also an operating system command to display the function key contents, so you'll have to type */SHOW, which is an abbreviation for *RUN SHOW.

If you only want to hide certain files, you must copy the disc, delete the files you don't want to hide, perform a *HIDE, and then copy the other files back. Any new files you create after hiding a catalogue will be added in a perfectly normal manner, and will not affect the hidden ones. However, any hidden files which are loaded and then resaved onto the disc will probably appear once more.

There is a problem. The *HIDE command is of course a disc-based command, and by typing its name, you are *RUNning, it. Clearly, if you want to hide the catalogue of another disc, this disc will have to be in a different drive to the one having the *HIDE command. If you have two drives, you can have the HIDE program in a different drive to the disc being altered, and use the optional drive parameter. There is a way of getting around this even if you only have one drive. Firstly, you can load the HIDE program into memory with *LOAD HIDE, change discs, and run it by typing CALL &A00. The SHOW program can be used similarly.

£5

CONTROLLABLE ON ERROR

Jonathan Temple from Nottingham points out that the ON ERROR system has flaws when it's used in programs that use the Escape key. If you write a program which relies on ON ERROR taking over when Escape is pressed, then you cannot return directly to where you were in the program, but go to a common point, usually a main menu, outside any loops or procedures.

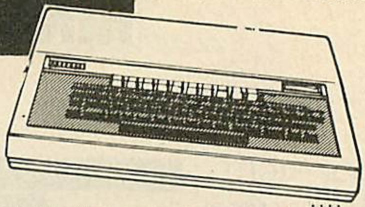
Jonathan suggests that a better approach is to be able to tell that Escape has been pressed by reading a variable. Your program can simply read the flag when you need to test if Escape has been pressed. Listing 6, which should be executed by your program before it needs to use the flag, will set E% to –1 if Escape is pressed. You can therefore just test the value of E% and act if it has been set to –1. The value of E% must be set back to zero by you before doing the test again.

Every time Escape is pressed, an 'event' is generated by the operating system. This just means that the code pointed to by Evntv, a vector at &220, is called with the A register set to the event number. In the case of Escape, A is 6. Jonathan's code is set to receive all events, but only event number 6 is 'enabled' by *FX14.

This may give you other ideas about code to be executed on events. Most interesting is event 4, the frame flyback, which occurs 50 times a second. This can be used as a 'continuous' event, to keep a clock in the corner of the screen and so on.

Details of the listings are on page 111.

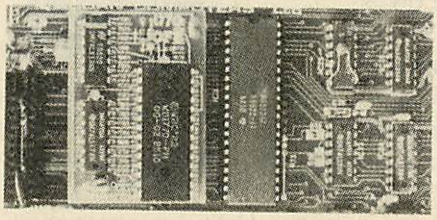
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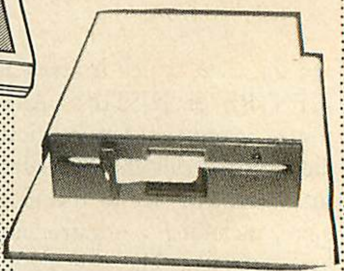


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DFS ROM

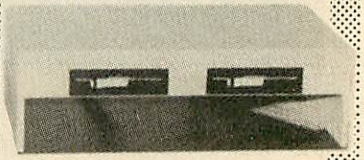
DFS ROMS:
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ADFS and DFS Version 2.1 ROM set (32k, 2 chips) for the 1770 chip:
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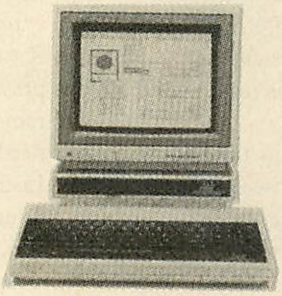


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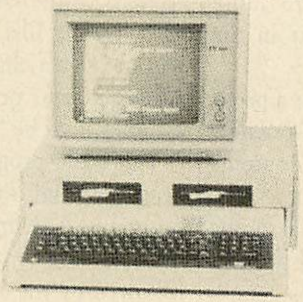
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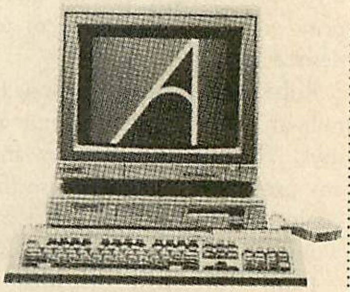
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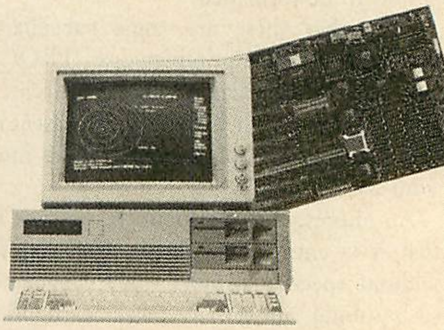
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SOLIDISK — WHERE TECHNOLOGY MATTERS

STEP BY STEP

A STACK OF CARDS

A straightforward guide to setting up a card index database with ViewStore – mailshots made easy

Bruce Smith

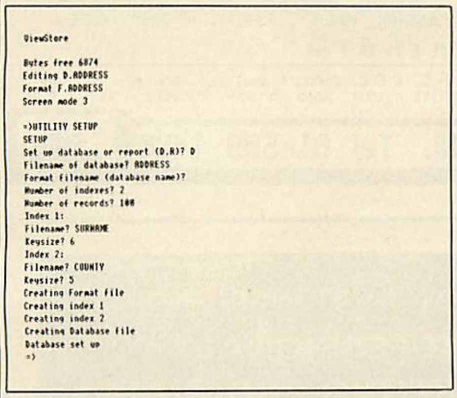
ViewStore is a versatile tool which can massage data into almost any format you need. In this first step-by-step look at *ViewStore* we'll be producing a simple but effective card index program. With this you'll be able to keep track of friends and clients, print labels for envelopes and even start off an effective mail-merge system.

As always, preparation is the most vital stage. It lays the foundations. Sketch out the type of record card you require and note down the number of characters required for each item on the card.

In database jargon each card represents a 'record' in the database and each heading on the card is a 'field'. So in the example each record (card) has 12 fields (headings).

Decide on the number of records – over estimate if in doubt; we'll use 100. This will make the database about 20k long.

Finally prepare a new blank disc. If you are using ADFS you must create directories F, D and I before going any further, and label the disc 'Address Book'.



Setting up

Set *ViewStore* into action, place your blank disc in one drive, the utilities disc in the second and set the PREFIX options

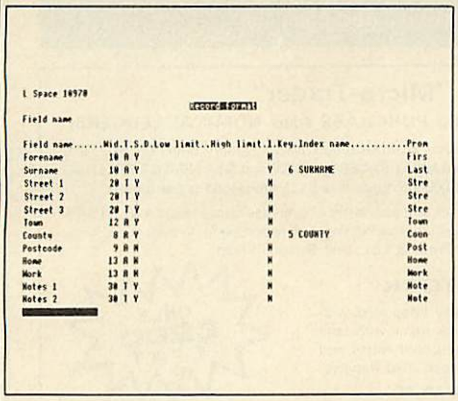
PREFIX U:1.

If you're using a single drive, don't set the prefix,-*ViewStore* will prompt you to insert the utility disc when needed.

Using the SETUP utility (UTILITY SETUP), create the database using the database and file format name 'Address'. Card indexes are normally sorted by surname so an index will have to be created to allow for this. We'll also use a second index to sort by county. The keysizes (the parts of the field used for sorting) are 6 and 5 respectively which will allow *ViewStore* to sort both quickly.

The SETUP utility will automatically create the files needed on your disc and once the => prompt returns, load the address database using:

LOAD address



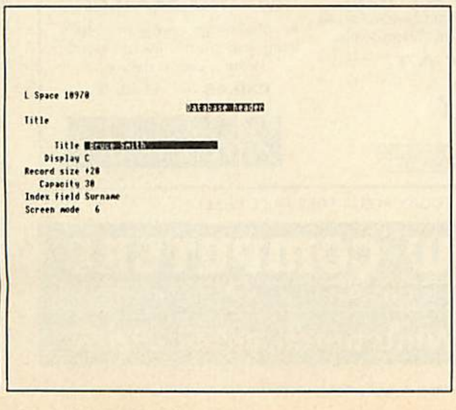
Customising the record format

Once loaded press Escape to enter the database. Press f1 (Record Format) to display the field details, which will be blank. The format for each of the fields must now be specified and the complete details are listed in table 1.

Alphanumeric fields have been used for all and scrolling has been turned off. A numeric field could be used for both home and work phone numbers but this would not allow you to enter brackets or text if you needed to.

Only two index fields are required, so with the exception of Surname and County, an N should be entered in this column. It is a good ideal to make the index name match the field name for convenience's sake. Finally enter your own prompt string should you desire one.

The Decimal, Low/High Limit and Value List fields have all been left blank. Press f0 when you have finished.



The database header

Press Shift-f1 (Database Header) to display the blank header information form. The database header defines how the card index will look on-screen. Two displays are possible – card or sheet – we need card.

When each entry is made, a number of extra bytes will be appended to allow for adding to entries. Typing +20 will add 20 bytes to accommodate any expansion.

The 'Capacity' value determines the number of records that will be loaded into memory at any one time. Pressing Return sets a default of 50 but if you don't have use of shadow or Tube memory decrease this to speed things up.

Card indexes are normally arranged in surname order so enter 'Surname' as the index field. If you leave it blank, entries will be indexed by entry order.

Finally screen mode – enter 6 for the time being. Experiment with other modes later to find which you prefer.

STEP BY STEP

```
Card layout

Forename ____________
 Surname ____________

          Street 1 ____________________
          Street 2 ____________________
          Street 3 ____________________
              Town ______________
            County ____________
          Postcode __________

      Home ____________
      Work ____________

     Notes 1 ____________________________
     Notes 2 ____________________________
```

The card layout

Pressing f0 (Data) will deposit you in the database ready to enter data, but the screen will be a jumble of blank card entries – these need to be positioned neatly. Press Shift-f0 (Card Layout) to display a single card. Each field can now be moved to the required position on the screen. Position the cursor anywhere in the last field (Notes 2) and press Copy – an asterisk will appear in the field name. Then move the cursor to the position required and press copy once again. Do this for all the fields until the end result is to your satisfaction.

The fields can be positioned on-screen in any order you like, however the data entry order will stick to the order of the fields listed in the field formats form. So Forename will always be highlighted before Surname even if it comes before Surname on the card layout.

```
L Space 19823 Indexed by Surname
                           Bruce Smith
Notes:

Forename Graham
 Surname Bell

          Street 1 Acorn User
          Street 2 Redwood Publishing
          Street 3 20-26 Brunswick Plac
              Town London
            County
          Postcode H1 6DJ

      Home
      Work 01-490 1444

     Notes 1
     Notes 2
```

The final layout

A typical completed layout is shown on the left. To begin entering data press f0 (Data). The cursor will move from field to field each time you press Return; should you wish to move back to a field then use the left and right cursor keys.

Always ensure that you complete an entry before moving into the next one – remember only 20 bytes can be added to the current length and if the entry is not complete when you move on there may not be enough space to complete it afterwards.

You can edit entries by using CTRL and the cursor keys to move along the line then use Delete, Insert (f8) or just overtype the old information. There's never any need to save data – *ViewStore* does this automatically.

```
ViewStore

Bytes free 10098
Editing D.ADDRESS
Format F.ADDRESS
Screen mode 3

=>LIST
1  Forename    2  Surname    3  Street 1    4  Street 2
5  Street 3    6  Town       7  County      8  Postcode
9  Home        10 Work       11 Notes 1     12 Notes 2

=>UTILITY SELECT
SELECT
List or create select file (L,F)? L
Screen or Printer (S,P)? S
Select criteria? SURNAME = "BELL"
Select criteria?

Graham    Bell    Acorn User    Redwood Publishing

1 record selected out of 8
=>
```

Locating information

A database is for locating information, and perhaps the quickest way to do this in a large file is to use the SELECT utility. This allows you to locate a selection of records, which can be sorted on any number of fields. Typing LIST at the => prompt reminds you of the fields in the database.

Entering UTILITY SELECT will set the process rolling. If you are looking to locate more than a few records it is worth saving these to a file by pressing F rather than L when prompted.

The selection criteria can involve any field, but to locate a surname simply use: Surname="name" when prompted, 'name' being the surname in question. If a file had several Smiths in it, say, then a forename could be specified as well. Entering a Return at the next prompt sets the utility searching through the disc-based file, and the information is listed to screen or file.

```
ViewStore

Bytes free 10970
Editing D.ADDRESS
Format F.ADDRESS
Screen mode 3

=>UTILITY LABEL
LABEL
Use select file (N,Y)? N
Screen or Printer (S,P)? P
Label height (lines)? 8
Lines between each label? 1
Width of label? 64
Characters between each label? 0
Number of labels across the page? 1
Line 1? FORENAME, SURNAME
Line 2? STREET 1
Line 3? STREET 2
Line 4? STREET 3
Line 5? TOWN
Line 6? COUNTY
Line 7? POSTCODE
Line 8?
```

Creating labels

Having names and addresses on hand means it is a simple matter to print address labels using the LABEL utility.

Using the LABEL utility for the first time is a bit hit and miss as the settings you need to use in answer to the prompts will vary depending on the labels you use. Use informed guesses first and edit these until it works exactly – remember to make a note of these in your *ViewStore* manual or somewhere safe.

If you only want to create labels for all your friends who live in Herts, for example, you will need to create a selection file first.

As the figure shows, more than one field can be placed on a single line thus allowing linked fields such as Forename and Surname to be printed side by side. If you elect to print the labels then a test alignment option is available (answer Y to the prompt) which allows you to re-position the labels in the printer after printing a test set or two.

Field name	Wid	T	S	I	Key	Index name
Forename	10	A	Y	N		
Surname	10	A	Y	Y	6	Surname
Street1	20	T	N	N		
Town	15	A	N	N		
County	15	A	N	Y	5	County
Postcode	9	A	N	N		
Home	12	A	N	N		
Work	12	A	N	N		
Notes1	25	A	N	N		
Notes2	25		N	N		

Table 1. Record format details

STEP BY STEP

```
ViewStore

Bytes free 10050
Editing D.ADDRESS
Format F.ADDRESS
Screen mode 3

=>UTILITY MACRO
MACRO
Use select file (N,Y)? Y
Field 1? FORENAME
Field 2? SURNAME
Field 3? STREET 1
Field 4? STREET 2
Field 5? STREET 3
Field 6? TOWN
Field 7? COUNTY
Field 8?
7 fields
Two letter macro? AD
Output filename? ADMACRO
Creating macros........
8 records processed
0 fields split
=>
```

Generating macros

The address database can also be used to generate macros for use in *View*, which is ideal for general-purpose mailings. The MACRO utility does the work and, as with all other utilities, a select file of records can be used. Enter the fields as requested (Forename, Surname, etc). Supply a two-letter macro name and a filename and the utility will do the rest for you.

The output file can then be read into *View* and a suitable macro template created.

```
LM 10
DM AD
CE @0 @1
   @2
   @3
   @4
   @5
   @6 @7
RJ 1st April 1988

   Dear @0

   Your subscription to Acorn User will lapse after you have
   received the May issue.  To ensure you will be sent the
   next twelve month's issues, please fill in and return the
   attached subscription renewal form.
PE
EM
AD Graham,Bell,Acorn User,Redwood Publishing,20-26 Brunswick Place,London
AD Ian,Jones,230 Belvedere,Lynton,Nottingham, Notts,N15 3SJ
AD Sue,Keelan,Top Flat,36 Clevedon Road,Southfields,Epsom,Surrey,S19 7HP
AD Geoffrey,Collins,12 Westmorland Road,Waterside,Norton St Phillip,Bath,Avon,B
```

Things to do

One problem with creating a database exactly to your current requirements is that it leaves little capacity for expansion – it's difficult to add more fields. One way to get around this is to get into the habit of creating two or three dummy fields, called Dummy 1, etc. Enter them into the field format but set their widths to 0 which means that they won't request data. When you need to use them, just edit in new field names and set the appropriate field width.

If you decide that you want to alter the format of your database then remember that you can create different format files and save and load them to and from the current database using the SF and LF commands from the command screen.

To create new formats you will need to edit the current format file, so this should be saved under a new name first. All format files are automatically saved in the F directory on your disc.

A new format file can be used with a database when it is loaded simply by specifying it after the filename (minus the F) when loading, ie:

LOAD Address Format2

ViewStore is one of the best programs available for the BBC micro, its only real limitations being due to the small memory of the machine. This leads to a lot of disc access and slows things down considerably. We'll be returning to *ViewStore* in the future to look more closely at the utilities, in particular the REPORT utility.

Having problems?

Are you having problems with some commercial software? Or do you have a good idea that might be suitable for Step by Step? Let me know about it. Send them to Bruce Smith, Step by Step, *Acorn User*, Redwood Publishing 20-26 Brunswick Place, London N1 6DJ.

ARC AGORA

COMPUTING COLOURS

Athens' agora was the Greek equivalent of Rome's forum, so what else could we call our regular new Archimedes feature?

Dave Acton

Archimedes Agora is the new, regular slot that will be devoted to learning about the Archimedes range of computers. Each month, we'll examine one particular aspect of the new Acorn machine. This month we'll look at colours and graphics. In future issues we plan to shed light on the Archimedes' powerful stereo sound system, using sprites and the complexities of BBC Basic 5.

Above all else, Arc Agora is for you to express your ideas, and present your programs and solutions. All submissions are welcome, and any published will receive up to £20.

A COLOURFUL LIFE

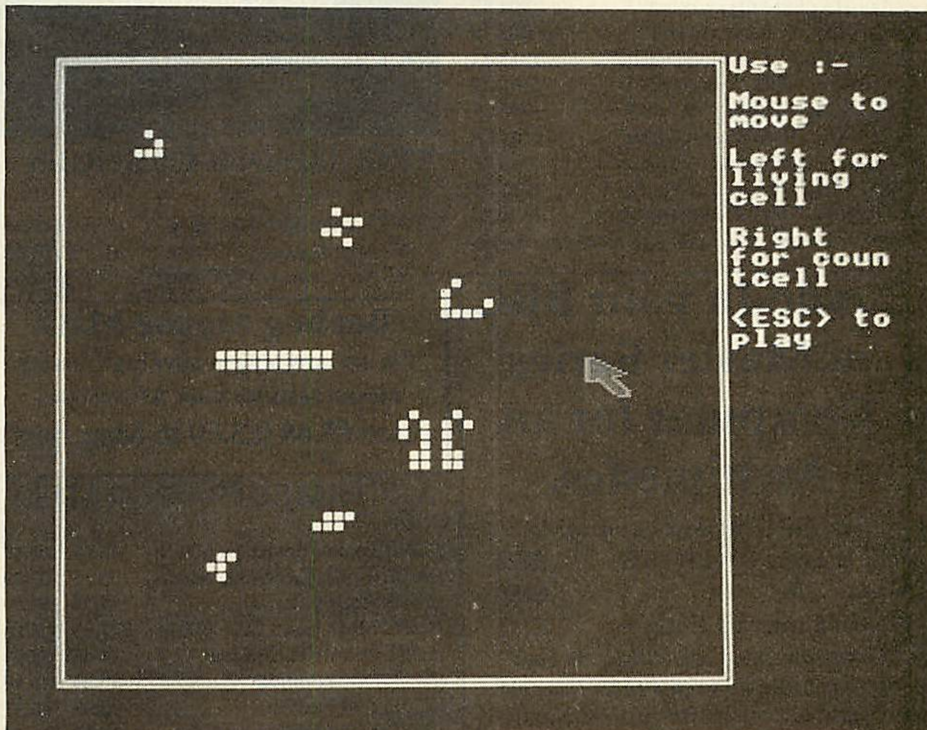
Our first Arc Forum submission comes from Kim Latt of Odense in Denmark. It's a particularly speedy version of John Conway's classic 'Game of Life', listing 1 on the yellow pages.

The mouse is used to set up a population of 'cells'. Select creates a cell, and the Menu button destroys one. When complete, pressing Escape causes the next generation to be formed. The rules of the game are:

- A cell will be born in a space if the space exactly two neighbours.
- A living cell will die of loneliness if it has fewer than two neighbours, or of overcrowding if it has four or more.

Press the Space bar to see the next generation, or Escape to set up a new pattern of cells.

Note that Kim's version uses a 256-colour mode to good effect: cells begin as white and change colour with age. You could try setting up some of the best-known Life objects shown in the picture. For example the glider moves slowly across the screen, while the R-pentomino grows continuously – a cancerous formation! The 11 x 2 block just remains static.



Life objects; glider, clock, spaceship, 11 x 2 block, tumbler, toad and R-pentomino

PALETTE PROBLEMS

The graphical capabilities of the Archimedes are initially the most impressive, particularly to BBC micro users. But to put the very much wider choice of colour to best use, you need to be able to understand exactly how the Archimedes graphics system works.

You probably know that the BBC micro has eight screen modes with up to 16 colours and resolutions up to 640 by 256 pixels. There are, for example, two four-colour modes on the BBC – mode 5 (with a resolution of 160 by 256 pixels and using up 10k) and mode 1 (320 by 256 pixels and using up 20k). So discovering that the Arc has a four-colour mode 8 with a resolution of 640 by 256 pixels and using 40k is no great surprise. Indeed, most of the Arc's screen modes are logical extensions of those of the BBC micro, but featuring twice or four times the horizontal resolution and therefore taking up twice or four times as much memory. If you have a multi-sync monitor, then you can also use double the vertical resolution.

The range of colours available has also been expanded. The BBC micro has two, four and 16 colour modes, a single pixel in each of these modes taking up one, two and four bits of screen memory respectively. The Archimedes has screen modes where eight bits per pixel are used, and this makes 256 colours available at once.

However, having 256 'logical' colours is no use unless you can define the 'physical' colours they produce. Although the BBC has a 16-colour mode, it only has eight *real* colours; hence the eight flashing colours in mode 2. This is because every colour is made up of the three primary colours, red,

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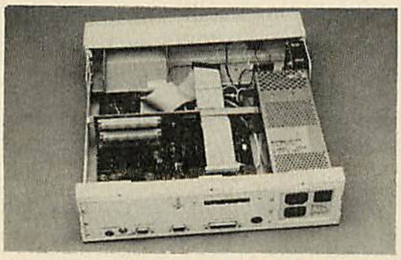
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green and blue, and the BBC micro allocates only one bit to each. The three bits provide a range of $2^3=8$ colours.

The Archimedes has a much greater scope however, and listing 2 on the yellow pages demonstrates the point. The Basic command COLOUR has been extended to allow for three extra parameters. The VDU 19 command has been extended similarly. The command:

COLOUR a,r,g,b

changes the physical colour of logical colour 'a' to a hue that comprises of 'r' units of red, 'g' units of green and 'b' units of blue. Although these three extra parameters are in the range 0-&FF, only the top four bits are recognised. So values of 0, &10, &20 and so on to &F0 should be used: other values will be rounded down.

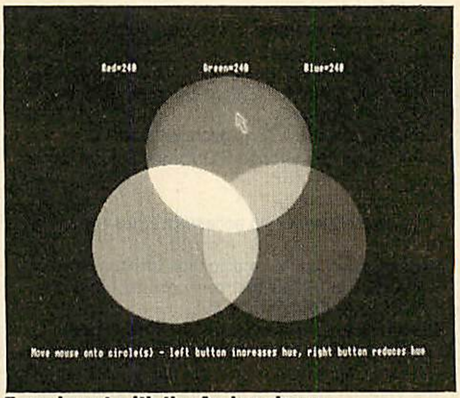
Even with this limitation however, there are 16 different levels of each primary colour available, and this provides a total range of $16^3=4096$ colours.

Listing 2 on the yellow pages demonstrates how colours may be 'mixed' using the RGB system. Three circles are plotted in each of the primary colours, and the mouse is used to vary the brightness of each constituent colour.

The circles are plotted using the GCOL 'or' facility. Mode 12 is used and the default colours for this mode happen to produce the correct mixing effects: green plus blue gives cyan, for example. This is not by chance – the default colours are the same as those for the BBC micro's mode 2 and, as we've just explained, a single bit is used in mode 2 to indicate the strength of each primary colour. So, setting the green and blue bits (2 and 4) we create cyan (6).

Once the circles have been plotted, the mouse pointer is switched on and the mouse position and buttons are examined continuously. The distance from the pointer to the centre of each circle is calculated, and if the pointer is within the circle, the mouse buttons are checked. The left and right buttons increase and decrease the intensity of any colour circle the pointer is inside. The extended colour statement is used to update the physical colours.

Using a 256-colour mode is much more complicated. Selecting the logical colour still uses COLOUR or GCOL, but there are differences. First, higher values used in COLOUR and GCOL statements are used on the BBC micro to alter the background. Partly for this reason, a TINT option has been devised. Only the bottom six bits of a



Experiment with the Arc's colours

colour may specified after COLOUR or GCOL – the remaining two bits are appended by TINT which is always a multiple of 64. So, to select colour 203, the command required is

COLOUR 11 TINT 192

As the palette is arranged normally, the bottom two bits of the COLOUR number control the amount of red, the middle two control the amount of green and the top two control the amount of blue.

One limitation of the VIDC chip in the Archimedes is that it has only 16 palette registers: there isn't one for every colour in a 256-colour mode. Only the bottom four bits of the colour number are used to select a palette register. The remaining four bits of the colour number are fed directly to the screen, where they control the amount of red, green and blue.

The COLOUR number (which is also the number stored in the screen memory) is divided up in the following way:

Bit	Meaning	
7	bit 3 of blue	
6	bit 3 of green	
5	bit 2 of green	
4	bit 3 of red	
3	bit 2 of blue	via palette
2	bit 2 of red	via palette
1	bit 1	via palette
0	bit 0	via palette

So altering the palette in a 256-colour mode can only affect the actual screen colour subtly – because the most significant bits of the colour number are not affected by the palette. Bits zero and one are sent via the palette and affect red, green and blue elements of the colour equally.

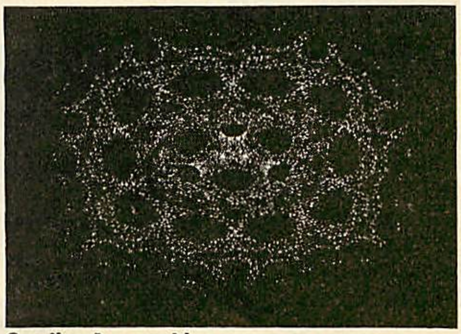
To have provided a full four bits per primary colour would have taken 12 bits in all. As only eight are available, two bits are dedicated to each colour and the remaining two are shared by all colours. This means that to alter the bottom two bits of any primary colour unavoidably alters the levels of the other primary colours as well.

Listing 3 on the yellow pages demonstrates this. Take note that the program is quite slow. Three primary colour circles are drawn, but the program attempts to scale the brightness of each circle from a maximum in the centre to a minimum at the edge. However, because of the limitations of the palette we've just described, it only half succeeds.

If you have a monitor with a 'green only' button it is worth running listing 3 and viewing the results with the button in and out. When just the green in the picture is displayed, a nice green scale is seen in the bottom right corner of the screen; with the button out, the other colours are unavoidably mixed in with the green.

To improve the system, Acorn would have to have designed 256 palette registers onto the VIDC chip, rather than the 16 it managed. However, unless you require specific shades provided by using TINT, it is probably best to forget about it and just use the top two bits of red, green and blue. After all, this will provide 64 different shades, which is quite enough for most programming applications.

ONE-LINE WONDER



One line Arc graphics

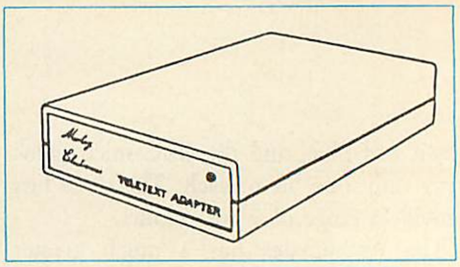
This month's quickie one-liner (listing 4) comes from a regular - David Lawrence. He's not quite sure how it works, but says it's based on an idea published in *Scientific American* some years ago. Again a 256-colour mode is used. Enter any three numbers when prompted and watch the pattern grow!

Send your ideas to: Archimedes Agora, Acorn User, *Redwood Publishing, 20-26 Brunswick Place, London N1 6DJ, or send them over Telecom Gold 81:RED001. The best we receive will be suitably rewarded.*

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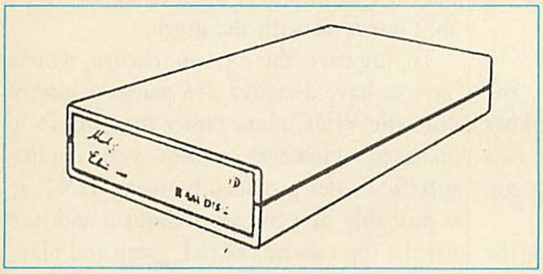
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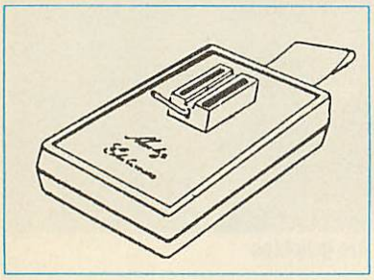
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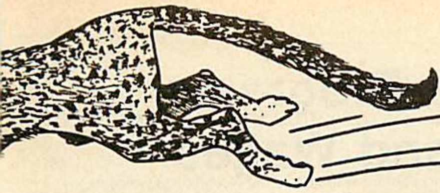
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1) Double entry bookkeeping for home or club use. All data kept in memory. Three character analysis code enables you to know where the money comes from and where it goes. 48 transactions per A4 page. Analysis summary of up to 30 categories.	£11.95+VAT
2) As 1) + Random Access giving 2000 items. CASH/BANK or VAT/BANK headings. Password controlled. String searches. For schools, clubs, churches, non credit business.	£19.95+VAT
3) As 2) + Credit facility and statements. For small working on credit businesses.	£29.95+VAT
4) As 3) + Invoicing, Orders, Quotations, etc. Full sorting of data by 5 options. Automated statements, mailing labels. Multiple automatic nominal ledgers. For independent schools and VAT businesses who wish to cut the effort.	£49.94+VAT
5) *Micro-Trader* is a full accountancy package with features right through to final Balance Sheet. Stock Control at £75 + VAT extra. For shops/firms wanting full accounting facilities. Payroll can be integrated.	£200.00+VAT

Mailing

218 to 1875 addresses on disc.
Multiple labels, mail merge and sorts. **£11.95 or £29.95 + VAT**

Family History £19.95 inc
Archimedes Version £24.95 inc

As far as we know the only genealogical program for the BBC written and sold by genealogists for genealogical enthusiasts.

Send for full brochure of these & other items.
Demo payroll disk £2.50. Postage add 57p.

Micro-Aid (AU), 25 Fore Street, Praze, Camborne, Cornwall TR14 0JX or telephone 0209-831274 with ACCESS

Pro-Punter

"ONE OF THE EASIEST WAYS OF MAKING MONEY WITHOUT GETTING ARRESTED."
–8000 plus, MARCH 1988

Four years ago we set out to design an expert system which would turn the home micro into a powerful race-forecasting tool and offer the user a real chance to make money.

One year ago we started selling it.

Have we been successful? Judge for yourself:

WHAT OUR CUSTOMERS SAY......
"Very impressed....." *KJC. Avon*
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"Won 15/2, 4/1, 11/4.....an excellent set of results." *MO. Essex*
"Excellent......" *MS. London*
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WHAT THE PRESS SAY......
"......technology to beat the bookies." *Raceform Handicap Book, May 1987*
"......the initial investment in a profitable enterprise......" *Acorn User, October 1987*
"......has the potential to turn bookie- bashing into an art form." *Micro User, February 1988.*
"......confound the septics." *8000 +, March 1988*
"......technically a first class package." *Computing with the Amstrad PCW, April 1988*

*PRO-PUNTER has created more than £920 investment profit to a £10 level-stake from 100 race forecasts proofed to the racing press.
NEED WE SAY MORE?
The BBC edition of PRO-PUNTER now costs £49.99 inc. VAT, p & p.
ORDERS AND ENQUIRIES TO DGA SOFTWARE, PO BOX 36, ASHTON- UNDER-LYNE, OL7 9AR.

DOUBLE PHANTOM?

Bargain prices for 88

YES! This IS the program demonstrated on BBC TV's "Micro Live". The Worlds first micro multi-user combat flight simulation is now available direct from DOCTOR SOFT via our 'HOT LINE' FIRST CLASS MAIL ORDER service

DOUBLE PHANTOM is basically a TWO computer version of the highly acclaimed PHANTOM COMBAT simulation. At least one BBC must have a disc system. A hardware link (included) then links the machines which become separate aircraft sharing the same airspace, each VISIBLE and VULNERABLE to the other!

DOUBLE PHANTOM has all the usual PHANTOM features including the fastest and smoothest 3D colour graphics around (15fps). RAF Phantom pilot Paul Courtnage's verdict: "Marvellous . . . quite the best micro flight simulation I've ever seen . . . Totally captivating!"

Phone: Mail Order Hot line 0903 776000 with VISA/ACCESS. Mail: PO BOX 66, East Preston, West Sussex BN16 2TX. Most orders despatched SAME DAY, FIRST CLASS, POST FREE.

DOUBLE PHANTOM (inc link)		BBC ★	disc 9.99
LINK separately		BBC	cable 4.99
PHANTOM COMBAT		BBC ★	disc 4.99
PHANTOM COMBAT	Electron &	BBC	cass 2.99
747		BBC B only	disc 4.99
747		BBC B only	cass 2.99
747	Electron		cass 2.99
747	Commodore 64		cass 4.99
747	Commodore 64		disc 9.99
747	Commodore 64 (USA format)		disc 9.99

(overseas orders, equiv currency, add air mail at cost)
JOYSTICKS optional with all programs
BBC means all machines from 32k up
★ SPECIFY DFS when ordering discs

DOCTOR SOFT – THE FLIGHT SIMULATION SPECIALIST

TECHNOMATIC

BBC COMPUTERS & ECONET CENTRE

17 Burnley Road, London NW10 1ED Tel: 01-208 1177 Fax: 01-452 1500
305 Edgware Road, London W2 Tel: 01-723 0233 Telex: 922800

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300 & 400 SERIES

Archimedes 305 Basic	£699(a)
Archimedes 310 Basic	£775(a)
Archimedes 310M Basic	£835(a)
Archimedes 410 Basic	£1,399(a)
Archimedes 440 Basic	£2,299(a)
Monochrome Monitor*	£50(a)
PC Emulator Software (when purchased with computer)	£60(d)
Colour Monitor*	£195(a)

*Monitor prices applicable only when purchased with the micro.

ADD-ONS

0.5Mb Ram upgrade kit (for 305)	£79(c)
2nd Floppy drive (for 305, 310 & 410)	£125(b)
Econet Module (with stn set disc)	£43(c)
Backplane for 2 podules	£39(b)
I/O Podule	£79(b)
20Mb Hard Disc + Podule	£499(a)
Acorn Rom podule	£59(c)
CC Rom Podule	£49(d)
Acorn Midi I/O card	£29(c)

More podules are expected in the coming weeks please telephone for latest updates

IEEE Interface Podule £283(b)
Full implementation of IEEE std 488 1978 & supp. IEEE std 488A 1980. Full specification on request.

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Arc. to BBC Serial Link (Software for both Arc & BBC)	£25(c)
Arc. to PC/XT (Software for both Arc & PC)	£29(c)
Arc External Drive Adaptor	£25(d)

BOOKS: *(no VAT)*

Arc. Ref Manual	£29(b)
ARM Assy Lang Prog	£12(d)

SOFTWARE:

PC Emulator	£99(d)

LANGUAGES:

ANSI C	£95(c)	ISO PASCAL	£95(c)
Prolog X	£199(b)	FORTRAN 77	£95(c)
LISP	£199(b)	COMAL	POA

PROGRAMMERS TOOLS:

TWIN *Editor*	£29(d)
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Software Dev T/Box	POA
Software Dev Debug T/box	POA

PRODUCTIVITY TOOLS:

Logistix (incl Spreadsheet, timesheet, d/base & Graphics)	£95(c)

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First Word	£POA
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View SKM31 (e)	£49(d)
InterWord (e)	£39(d)

DATABASES

Deltabase	£26(d)
Systems DeltaPlus	£60(d)
Alphabase	£41(d)
Viewstore SKM27 (e)	£52(d)

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Viewsheet SKM07 (e)	£52(d)
Intersheet (e)	£39(d)

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FREE £115 inc vat VOUCHER

with every Archimedes model 310, 410 and 440 purchased from us. This voucher can be redeemed against any future purchase made from us. Additionally we will offer discounts upto 10% on Archimedes software and upto 5% on Archimedes hardware stocked by us to all purchasers of Archimedes computers. This is a limited period offer so do not miss your opportunity for a bargain not to be repeated.

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Minerva's suite 5 Modules (ea) £54(d)
Order Processing, SalesLedger, StockManager, Purchase Ledger & Nominal Ledger

GAMES:

ZARCH	£17(d)
Minotaur	£11(d)

Software packages marked with (e) run under 6502 emulated mode.

Please check on availability of some of the above packages

FILE STORE

Acorn's new file server system

Filestore E01	£825(a)
Filestore E02	£699(a)

Full details on request

ECONET ACCESSORIES

Econet Starter Kit	£85(b)	Econet Bridge	£174(b)
Econet Socket Set	£29(c)	Printer Server Rom	£41(d)
File Server Level II	£75(b)	10 Station Lead Set	£26(d)
Master FS Utility Disc	£17.25(d)		

ECOLINK

Ecolink allows you to connect a PC/XT or AT to an econet network. Supplied complete with comprehensive manual, software and cable.
Full spec on request £299(b)

UPGRADE KITS

1.20S ROM	£15(d)	ADFS ROM	£26(d)
DNFS ROM	£19(d)	1770 DFS Kit	£43.50(d)
BASIC II ROM	£22.50(d)	Econet Kit	£55(d)

EPROMS/RAMS

2764-25
27128-25 (12.5V Vpp)
27128-25 (21.0V Vpp)
6264LP-15
27256
27512

All prices on application

MASTER SERIES

AMB15 Master 128K £356(a)
Includes *free* Educational/Fun software bundle from BBC Publications range (RRP £40) and a STARdataBASE package worth another £40.

AMC06 Turbo 65C102 Module	£95(b)
ADC08 512 processor	£185(b)

ADF10 Econet Module	£40(c)	Acorn Rom Cartridge	£13(d)
ADJ22 Ref Manual I	£14(c)	ADJ23 Ref Manual II	£14(c)
View User Guide	£8.50(d)	V/sheet User Guide	£8.50(d)
TRC2 2ROM Cartridge	£7.50(d)	TRC4 4ROM Cartridge	£11(d)
		Master Dust Cover	£4.75(d)
TRC32 32K RAM Cart.	£29(d)		

Acorn 32016 Co Processor	£949(a)
Acorn X25 Gateway	£2175(a)
Acorn IEEE Interface	£265(b)
Universal CoProc Adapter (incl DOS+ & GEM suite)	£69(b)

Send for detailed list of DOS software for 512

MASTER COMPACT

All Compact systems come complete with 128K of RAM, 640K 3.5" double sided drive and educational software. Additionally we include our Education/Fun software bundle to the package.

SYSTEM 1 Entry system	£310(a)
SYSTEM 2 with 12" Hi Res Mono Monitor	£365 (2xa)
SYSTEM 3 with 14" Med Res Col Monitor	£475 (2xa)
Compact 2nd Drive Kit	£95(c)
Serial Kit	£25(d)
TV Modulator	£26(c)
Mertec Adapter (upgrades Compact to almost Master level)	£35(c)
External Drive adapter Cable	£9(d)

Z88 PORTABLE MICRO

A lightweight compact micro that can be carried in a brief case. Software available for transferring data to BBC and PC systems.

Z88 Micro c/w rechargeable batteries	£239(a)
Mains Adaptor	£8.65(d)
NiCad Rechargeable Battery	£2(d)
32K RAM or Eprom Pack	£17.35(d)
128K Ram or Eprom Pack	£43.40(d)
Z88 BBC Link with software	£21.70(d)
Parallel Printer Cable	£24(d)
Serial Printer Cable	£8.65(d)

SANYO CRT 70
14" Hi Resolution RGB Monitor
£209
RRP £429 12 months Warranty

CANON PW1080 Printer
£199(a)
12 months Warranty

RAM/ROM EXPANSION

ATPL Board for Model B. Simple to instal, no soldering. Allows expansion to 15 Roms +2*8K RAMS	£37(c)
ATPL Battery backup kit	£18(d)
ATPL Board for BBC+	£31(c)

TECHNOMATIC

17 Burnley Road, London NW10 1ED Tel: 01-208 1177

TECHNOMATIC DISC DRIVES



TS 400

A range of high quality high performance drives to meet the needs of all BBC Micro Users.
All drives fitted with high quality, slim line Mitsubishi drive mechanism and necessary cables.
*All drives are fitted with high quality slim line ultra low power mechanisms capable of single and double density operation and offering fast track access and head setting times. Our confidence in their quality enables us to offer a **two year parts and labour warranty** on these mechanisms without any extra charge.
*5.25" floppy drives are fitted with 40/80 track switches as standard at no extra cost. The switches are located in the front and clearly marked to indicate the status at a glance.
*The mechanisms are set inside attractively styled, sturdy metal casings painted in BBC beige colour.
*All drives fitted with all necessary leads and are ready for operation on unpacking. The drives with the mains power supply are supplied with a mains lead fitted with a suitably fused 13A moulded plug.
*TECHNOMATIC drives stand out from other drives because of the high quality of construction and use of reliable switchmode power supply units on dual drives.



PD 800P

5.25" Single Drives 40/80 switchable:	
TS400 400K/640K	**£90(b)**
PS400 400K/640K with integral mains power supply	**£104(b)**
5.25" Dual Drives 40/80 switchable:	
TD800 800K/1280K	**£170(a)**
PD800 800K/1280K with integral mains power supply	**£190(a)**
PD800P 800K/1280K with integral mainspower supply and monitor stand	**£209(a)**
3.5" 80T DS Drives:	
TS351 single 400K/640K	**£67(b)**
PS351 single 400K/640K with integral mains power supply	**£85(b)**
TD352 Dual 800K/1280K	**£126(b)**
PD352 Dual 800K/1280K with integral mains power supply	**£149(b)**
Combo Drives (5.25" & 3.5" drives)	
PD853 with integral psu	**£165(a)**
PD853P with integral psu	**£179(a)**
DISC DRIVE MULTIPLEXER	
see page 5 of this ad for details	
For Master, B, B+ and any DFS/ADFS	
TDM2 Two computers/one drive unit	**£65(b)**
TDM4 Four computers/one drive unit	**£115(b)**

TECHNOMATIC WINCHESTERS

Technomatic offer the most popular range of Winchester drives for BBC micro systems at competitive prices. The drives are fully compatible with Acorn ADFS system. Fan cooled switch mode power supply ensure efficient and reliable operation. Combination of floppy and winchester drives in our elegant plinth housing provides an ideal solution for need to have large storage and ease of transferring data to floppies.

Technomatic front end utility for the Master supplied with the winchesters at no extra cost provides an easy and efficient file management system. The entire contents of the drive are displayed on the screen on boot up, each file or directory appearing as an icon. The icon type indicates whether directory or file and type of data if latter.

Larger capacity drives available on request.

P20HD TECHNOMATIC 20 Mbyte Winchester Drive	**£429(a)**
P30HD 30Mb Winchester Drive	**£449(a)**
P40HD TECHNOMATIC 40 Mbyte Winchester Drive with Acorn ADFS ROM	**£749(a)**
P204HP TECHNOMATIC 20 Mbyte Winchester and a 80T DS floppy Drive built in a monitor stand. Includes ADFS Rom.	**£609(a)**
P2041HT As P204HP but also with a 10 Mbyte tape streamer backup unit and backup utilities. Includes ADFS Rom.	**£1179(a)**
TS10 10 Mbyte Tape Streamer Backup unit with utilities.	**£599(a)**
TFC10 10 Mbyte Pre-formatted Cartridge for use with P2041HT and TS10.	**£19(d)**

Technomatic Winchesters can be adapted to operate with the SJ Research FileServer by internal modification. However this must be specified at the time of ordering otherwise the drive has to be returned to us for modification.

Adaptor for SJ FileServer	**£28**

WINCHESTER Drive Multiplexer
These units let you share a Winchester drive between a number of computers. Full details on request.

TWM2 for two computers.	**£99 (b)**
TWM4 for four Computers.	**£149 (b)**

NEW

Following the great success enjoyed by our P20HD unit, we are pleased to announce the launch of P30HD – a 30Mbyte hard drive. This drive is also supplied with the free front end utility for the Master. £449(a)

BULK DISCS

50 5.25" 40 T single sided discs with sleeves in lockable box.	**£25(b)**
50 5.25" 80 T double sided discs with sleeves in lockable box.	**£32(b)**
50 3.5" 80T double sided discs with sleeves in lockable box.	**£60(b)**

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5.25" Kit with 20 disposable discs	**£14.00(d)**
3.5" Kit with 20 disposable discs	**£14.75(d)**

DISC STORAGE BOXES

DB340 Lockable 40 × 3.5"	**£8.50(c)**
DB550 Lockable 50 × 5.25"	**£6.50(c)**
DB570 Lockable 70 × 5.25"	**£8.50(c)**
DB5100 Lockable 100 × 5.25"	**£10.50(c)**

3M FLOPPY DISCS



5.25" Discs in packs of 10	
744 40T SS DD	**£8.00(d)**
745 40T DS DD	**£9.75(d)**
746 80T SS DD	**£12.00(d)**
747 80T DS DD	**£12.75(d)**

3.5" Discs in packs of 10	
80T SS DD	**£13.50(d)**
80T DS DD	**£15.00(d)**

(Add £1 for library case packing)

FREE **Leatherbound Personal Organiser with every 50 3M discs**

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PRINTERS

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EPSON FX1000 £405(a) EPSON EX800 £395(a)
EPSON EX1000 £539(a)
EPSON LQ1050 £529(a)
EPSON GQ3500 Laser Printer £1290(a)
TAXAN KP815 £249(a) TAXAN KP915 £350(a)
NATIONAL PANASONIC KXP1081 £149(a)
NATIONAL PANASONIC KXP1082* £175(a)
STAR LC10 NEW £209(a)
INTEGREX Multicolour Inkjet printer £519(a)
BROTHER HR20 £349(a)
NAT PANASONIC KX P3131 £249(a)
includes massive buffer of 38K
JUKI 6100 Daisy wheel printer £295(a)
BBC/Master Parallel Lead (1.2m) £5(d)
BBC/Master Parallel Lead (2m) £7(d)
Compact Parallel Printer Lead (1.2m) £9(d)
Archimedes Parallel Printer Lead (2m) £9(d)

Price includes Free Master printer lead and WYSIWYG + ROM

EPSON LX800

Epson's latest budget printer offers a host of new features all utilising Epson's unrivalled knowhow of printer technology and reliability.

★ 180 cps draft/25cps NLQ ★ two modern fonts as std: Sans Serif and ROMAN. NLQ font selection from front panel ★ Tractor and friction feed ★ Single sheet guide with auto load switch. Original + 2 copies.
★ 3K input buffer with character downloading facility
★ Fully compatible with BBC & IBM graphics
★ Centronics interface as standard
★ Price including BBC master lead £179(a)

EPSON LQ500

Epson's budget 24pin letter quality printer provides unrivalled print quality with two built in letter quality fonts and widest repertoire of type styles at low cost. Sans Serif and Roman or draft font can be selected from the front panel as can print speeds with max resolution of 360×180 dpi. Friction and tractor as standard. Parallel interface. Designed for low noise operation 55dB(A).
Introductory price incl. master lead £329(a)

EPSON LQ850

Epson's latest 24pin letter quality printer has been specifically designed for optimum paper handling convenience. Both single sheets and fanfold paper can be loaded simultaneously and a single lever enables the selection of either for printing. Micro adjust feature enables paper feed forward or reverse in increments as fine as 1/180" – ideal for form setting. Auto load of selected paper to printing position. Very fast printing speeds 264cps draft & 88cps LQ. Sans Serif & Roman LQ fonts can be selected from front panel as can the character pitch.
LQ850 has been specially insulated to keep the noise level down to 55db(A). Parallel & Serial interface as std.
Introductory Price including BBC Master lead £419(a)

MODEMS

MIRACLE WS4000 V21/23 £135(b)
MIRACLE WS3000 V21/23 £244(b)
MIRACLE WS3000 V22 £409(b)
MIRACLE WS3000 V22 bis £537(b)
(All modems are BABT approved)
BBC Data Cable for WS3000/4000 £10(d)
MIRACLE WS2000V21/23 & BELL stds £92(c)

PLOTTERS

Hitachi 672XD A3 4 Colour HPGL £465(a)
Plotmate A4S £420(a)
Plotmate A3M £640(a)
Roland 880 A3 Flat bed 8 col £599(a)
Variety of Plotter pens and accessories in stock.
Larger Plotters available. Please enquire.

PRINTER SHARERS & BUFFERS

TSB256 Printer Sharer Buffer

Provides a massive buffer size of 256K and connects three computers to one printer. Autoswitching between computers. Facility to print copies. £189(b)

BUFFALO PB Buffer

Parallel buffer for internal fitting to most Epson printers. Simple to instal.
PB128 (128K) £89(c)

PERIPHERAL & COMPUTER SHARERS

High quality switches to allow the user to switch between computers, printers, modems etc. Fully shielded metal cases, all lines fully switched.

	Parallel		Serial	
2 Computers to 1 Printer	36v36-2	£25(c)	25v25-2	£25(c)
3 Computers to 1 Printer	36v36-3	£39(c)	25v25-3	£39(c)
4 Computers to 1 Printer	36v36-4	£45(c)	25v25-4	£45(c)
2 Computers 2 Printers			25v25-x	£49(c)
X-over	36v37-x	£49(c)		
BBC Cable Set 3 to 1 (1m ea)		£24(c)		
BBC Cable Set 4 to 1 (1m ea)		£30(c)		

BBC Computer Sharer: TCS26

1 computer to 2 printers fitted with BBC cable £21(c)

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Plain fanfold paper with microperforation:
2000 sheets 9½ × 11" £12 (£3.50)
2000 sheets 14½ × 11" £18.50 (£4.50)
1500 sheets A4 90gsm £18.00 (£4.00)

Labels/1000

Single Row 3½ × 1⁷⁄₁₆ £5(d)
Triple Row 2⁷⁄₁₆ × 1⁷⁄₁₆ £5(d)

PRINTER STAND

A new style printer stand with easy paper feed and paper seperation, provides complete access to paper. Can be used with both top and bottom paper feed. Very space efficient. £26 (b)

PROGRAMMING ACCESSORIES/SOFTWARE

Compatible with B, B+ and Master
EpromRyter (Epromer II)
EpromRyter is compatible with BBC Master only. See page 7. £89(b)
EPROMER II £89(b)
META ASSEMBLER £145(b)
PORTAL EPROM EMULATOR 512K £245(b)
TEAM Disassembler £145(b)
EPROM ERASERS
UV1B 6 eproms, safety cutout £47(b)
UV1T 6 eproms, timer, safety cutout £59(b)

MONITORS

All Monitors supplied with a suitable lead.

12", 14" and 20" MONITORS

Microvitec 1431
Std Res, 14" £179(a)
Microvitec 1431AP
Std Res + PAL/Aud, 14" £199(a)
Microvitec 1451
Med Res, 14" £225(a)
Microvitec 1451AP
Med Res + PAL/Aud, 14" £255(a)
Microvitec 1441
Hi Res, 14" £359(a)
Philips 14" RGB
Med Res, 14", high contract screen, TTL/Linear Input, Mono/Colour Switch Sound Input. Separate controls for brilliance and contrast. This is the monitor used by Acorn with Archimedes and Compact Computers. £195(a)
Sanyo CRT 70
14" High Resolution Monitor £209(a)
Resolution better than Microvitec 1441, suitable for Master, Archimedes.
Microvitec 2030CS
20" Standard Resolution RGB/Comp Video £380(a)
Microvitec 2040CS
20" High Resolution RGB/Comp Video £675(a)
TAXAN SUPER VISION 620
12" Hi Res/Hi Contrast Option to switch to green/amber BBC/IBM Compatible £269(a)
TAXAN SUPER VISION 625
12" Super Hi Res and contrast RGB Monitor with option to switch to mono BBC/IBM compatible. £319(a)
TAXAN 770+
MultiSysnc Autoscan 14", ideal for utilising the hi res modes on Archimedes. Our price includes a tilt & swivel stand £499(a)
NEC MultiSync II 14"
Enhanced version of the original NEC MultiSync. complete with tilt & swivel base. Suitable for Archimedes and PC compatibles. £489(a)

12" MONOCHROME MONITORS

PHILIPS BM 7502
Hi Res green screen £69(a)
PHILIPS BM7522
Hi Res amber screen £75(a)

TIME WARP

Real Time Clock, Plugs into the user port, battery back up as standard, includes manual, demo software including a diary/planner application program £29(d)

MONITOR ACCESSORIES

Microvitec Swivel Base (14" plastic monitors) £17(c)
Monitor Stand Models B & B+ £10(c)
Monitor Stand Master £13(c)
Double Tier Stand Models B, B+ or Master £24(b)
Taxan RGB Lead £7(d)
Microvitec Lead £4(d)
Monochrome BNC/Phono Lead £4(d)

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CAD/DRAWING PACKAGES

NOVACAD
Cad Package for B, B & MASTER.
(See page 5 for specification)

Tracker Ball/Mouse Version (TM)	£49 (d)
TM Version plus Tracker Ball	£94 (d)
TM Version plus Mouse	£79 (d)
Plotter Driver Generator	£15 (d)
MOUSE AMX MOUSE with SUPER ART (pse specify B, B+ or Master)	£59 (d)
STOP PRESS (Pagemaker)	£32 (d)
EXTRA/EXTRA (utility for the Pagemaker)	£19 (d)
MAX	£17 (d)
STAND ALONE MOUSE	£34 (c)
RB2 TRACKER BALL RB2 Tracker Ball with Icon Master (for B, B+ & Master)	£59 (c)
RB2 Tracker Ball with Cursor Control Rom (for Master only)	£59 (c)
RB2 Tracker Ball 'Stand Alone' for use with NOVACAD & other software)	£47 (c)
Cursor Control Rom for Master	£12.50 (d)
MIRRORSOFT FLEET STREET EDITOR	£35 (d)

CP/M SOFTWARE

Please send for details on our range of CP/M software for Acorn/Torch Z80 2nd Processors

BBC SOFT/FIRMWARE

DATABASE MANAGEMENT SYSTEMS

VIEWSTORE	£37 (d)
STARdataBASE	£39 (d)
MASTERFILE II	£17 (d)
ACORN OVERVIEW PACKAGE Special Offer (RRP £86)	£69 (b)

WORD PROCESSORS

ACORN VIEW PROFESSIONAL (BBC)	£69 (c)
VIEW 2.1	£35 (d)
VIEW 3.0	£45 (c)
VIEW INDEX	£12 (d)
VIEW PRINTER DRIVER GENERATOR	£8 (d)
VIEWSPELL	£29 (d)
DOT PRINT PLUS	£28 (d)
WORDWISE	£24 (d)
WORDWISE PLUS	£38 (d)
WYSIWYG PLUS	£21 (d)
SPELLMASTER	£47 (d)
INTERWORD	£39 (d)
WORDEASE	£24 (d)
SPELLCHECK III	£31 (d)
EDWORD II	£43 (c)

SPREADSHEETS

VIEWSHEET	£37 (d)
WINDOMATIC (A Viewsheet Utility)	£15 (d)
VIEWPLOT	£22 (d)
INTERSHEET	£37 (d)
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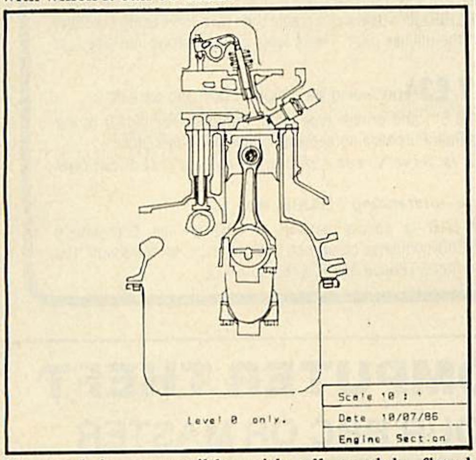
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Interbase £59.00
Acorn:
View 2.1 .... £45.00
View 3.0 .... £63.00
ViewPlot (Disc) £25.75
ViewSpell £33.50
Viewsheet £45.00
Viewstore £45.00
GXR (please state whether for B or B+) £23.00
ISO Pascal £52.00
LISP £39.00
BCPL £46.00
Logo £52.00
ADFS £26.04
Computer Concepts:
Wordwise Plus £40.00
Printmaster £25.00
Accelerator £48.00
Speech ROM £27.50
Spellmaster £46.00
Beebugsoft:
Toolkit Plus £33.00
Wordease £25.00
ICON master £29.00
ROMIT £29.00
Help II ROM £27.00
Sleuth ROM £27.00
Exmon II £28.00
Spellcheck III £32.00
MUROM £24.00
Pace:
Commstar £29.57

AMX

Please state whether for BBC or Master
AMX mouse with Super Art ROM £78.00
Stop Press £43.43
Paintpot £13.00
Desk £21.70
Super Art ROM £43.43
Database £21.70
3D Zicon £21.70
Utilities £13.00

ARCHIMEDES SOFTWARE

System Delta Plus Database £69.95
System Gamma Plus Graphics £69.95
System Delta Account (per module) £64.95
School Administrator £79.95
Video Rental £69.95
Newsagent £69.95
Clares Alpha Base £49.95
Clares Image Writer £29.95
Archimedes Took-kit Module £39.95

SPECIAL SOFTWARE

Torch Turbo Library
functions and procedures for Turbo Pascal to access the power of Torch/BBC facilities
Newnet
Powerful friendly Torchnet management software with password protection etc.
dBase special
dBase helper program now available for those who want to access the powerful facilities in dBase, without having to learn how to program in dBase

HOW TO ORDER

Payment by cheque to:
COMPUTACCOUNT (UK) LTD

Carriage: Items less than £50:£2.50, £50-100:£4.50
Carriage and insurance on items more than £100:£9.50

Please add VAT at 15% to Total, including Carriage.

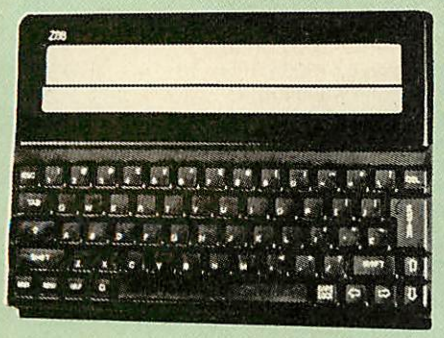
Send to Computaccount (UK) Ltd., 11 High Street, Harborne, Birmingham B17 9NT or telephone 021 427 9898

NAME ....
ADDRESS ....

Quantity	Item	Price	
		£	£
		£	£
		£	£

TOTAL £ ....

Z88 Sinclair's Portable Micro



FREE **Price:£239**

As an introductory offer, we are giving away, 4 rechargeable batteries and a compact Mains Battery Charger absolutely FREE with every Z88 bought from us this this month.

ACCESSORIES

Mains Adaptor	£8.65
32K RAM Pack or 32K EPROM Pack	£17.35
128K RAM Pack or 128K EPROM Pack	£43.40
Z88 BBC or PC Link	£21.70
Z88 EPROM ERASER	£34.75
Serial Printer Cable	£8.65
Parallel Printer Cable	£24.00
Z88 Modem	£86.90
AA Nicad Rechargeable Battery	£1.50
Battery Charger, Compact & Fast (3 Hours)	£6

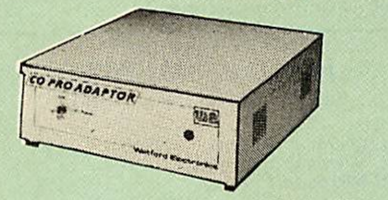
65C102 2nd PROCESSOR

(65C102 replaces the original Acorn 6502 2nd Processor)

This amazing package consists of the Acorn 65C102 'Turbo' Board, the Watford Co-Pro Adaptor and Acorn 1.2 DNFS ROM. The 'Turbo' board, running at 4MHz with 64k of additional RAM will increase the speed by between 50 and 200% depending on the application running, and allow a BASIC program of upto 44k in any screen mode. Simply by plugging in the Co-Pro and the DNFS ROM with its special Tube host code and you massively increase the power of any Model B. This is a complete package, with its own power supply, ready to interface with your BBC Micro.

£135

CO-PRO Adaptor



Now for the first time you can add the Master Co-processor boards, to your standard BBC model B, or B Plus. With this brand new launch from Watford Electronics you can attach any BBC Master co-processor to the original BBC Micro. Once again Watford strides ahead with a new concept in BBC B Micro add-ons. This unique external Co-Pro Adaptor, is protected by patent applications.
Use the super fast Turbo Board with your BBC B, it is much faster than the 6502 2nd processor superseding it.
With the 512K addon your standard BBC machine achieves IBM PC compatibility at a realistic price running GEM, Lotus 123 and many other programs. Included with the 512k package is a high precision mouse and the Digital Research GEM suite of software; GEM Desktop, GEM Write GEM Paint. This requires both the 1770 DFS and the ADFS to be fitted to your computer.
To use other co-processors you require a BBC B with DNFS 1.20 or higher, or BBC B+ fitted with 1770 DFS 2.20 or greater. Co-processors work exactly like a second processor.
Master owners may use Co-Pro to add a second Co-processor externally.
Watford, brings power to your BBC at only:

£35 (carr £5)

NEW

BBC PCB DESIGNER

At last! A PCB design package for the BBC Micro that eclipses some industry CAD software. Hard to believe, isn't it? Just look at some of the impressive package specification:

- Library Component Designer
- Component Library (over 200 parts)
- Component List Editor
- NetList Editor
- PCB Board Designer
- Plotter Driver
- Dot Matrix Printer Driver

This integrated suite of programs is packed full of sophisticated PCB related features making the design of a circuit board a dream instead of a nightmare.

Input for the design may be manual, taking components from the library and connecting them, or highly automatic starting from a netlist and list of components. In auto mode, PCB Designer will never allow you to forget a connection again! And of course, either in manual or auto mode, connectivity is maintained no matter how you later move the parts around and route the tracks. Connections snap together and angles are corrected, Through hole vias and track thickness are established automatically and many more features, far too numerous to mention here, are included in the system.

Some of the PCB Designer's features are:

- Over 120 library pad sizes/shapes
- Four colour adjustable palette
- Zoom range 2:1 to 1:4
- Highlighting of specific tracks
- Normal and surface mounted components
- Rapid screen review
- Menu driven
- Variable gridlock
- Switchable measurement grid
- Pre-select pan/scroll facility
- Large 24" x 24" Board size
- Copy route facility
- Connectivity held at all times
- Ratsnesting of part connections
- Auto-plaement of text references
- Text linked to parts
- Automatic placement of vias
- Printer and plotter outputs provided
- Comprehensive manual

TYPES OF PLOT OUTPUT

Top and bottom track artworks, top and bottom silkscreens, solder resist mask, drilling detail drawing and check plot. All these may be with pad holes on/off, scale of 2:1 or 1:1, board edge on/off, 90 degrees rotation, mirror image, width of pen, x & y offsets and batch plots to disc.

The above is only a taste of the superb features of this software, surely capturing previously unknown performance from the BBC Master computer. BBC B owners will need to fit at least one block of sideways RAM, Shadow screen memory and a disc drive. A trackerball or a mouse is also required.

BBC PCB Designer is supplied on a 32K PAL PROM and comes complete with two discs and a comprehensive manual containing examples and useful information on PCB design.

By the way, as a bonus, PCB Designer is also suitable for many other schematic drawing applications such as circuit diagram drawing.

Introductory Offer: £99

(Please write in for further technical details)

SPECIAL OFFER

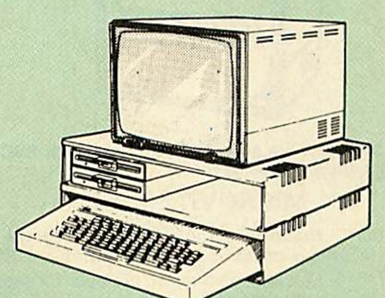
EPROMs for BBC's Sideways ROMs.

2764-250nS £3.00
27128-250nS (12V5) £3.25
27128-250nS (21V) £4.50

RAMs (Low power) for ATPL, WATFORD, etc., Sideways ROM Boards

6264LP (8K) £2.75
2 × 6264LP (16K) £5.30

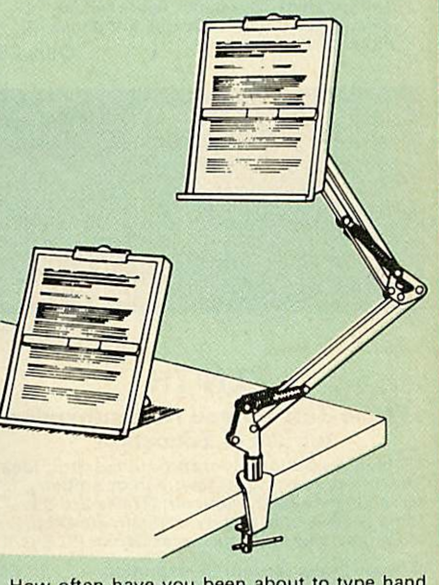
PLINTHS FOR BBC MICRO, MASTER & PRINTERS



Protect your computer from the weight and heat of your monitor. The BBC micro plinths have slots for maximum ventilation. The single plinth is suitable for a BBC and monitor, whilst the double height version provides enough room for our stacked or side-by-side dual disc drives or TORCH Disc pack, to be placed in the centre section. If you use our stacked drives, the remaining space can be used for further peripherals e.g. Speech Synthesizer, EPROM programmer or simply stationery. The computer slides neatly in to the lower section allowing easy access to remove the lid. The printer plinth is equally sturdy but without the cooling slots. It allows for access to the paper from the front as well as from the rear, (a facility not often thought of in similar products) if the paper is located beneath the plinth. This is a very convenient way to work especially if your work area is not deep enough to take the printer and paper separately.

SINGLE BBC PLINTH	**£11** (carr. £1.50)
DOUBLE BBC PLINTH	**£19** (carr. £3.00)
PRINTER PLINTH	**£10** (carr. £1.50)
SINGLE MASTER PLINTH	**£14** (carr £1.50)
DOUBLE MASTER PLINTH	**£24** (carr £3.00)

COPY HOLDERS



How often have you been about to type hand written notes into your computer when you find that there's nowhere to rest the paper or that your notes are resting at the wrong angle to read the type? Whether the notes be your latest program or the draft of a new trilogy, the new Manuscript Holders from Watford are superb for holding your paper at the ideal height and angle to allow you read and type in ease and comfort.
Available in 2 versions, desk resting and shelf clamping versions, these two units hold your paper firmly by means of a plastic retaining ruler and a clip grip. Both units are full A4 size.

Amazing value at only

Desk Top **£10** (carr. £2)
Angle poise **£14** (carr. £3)

Continued →



All Monitors are supplied complete with BBC connecting leads FREE.

MICROVITEC 14"

- 1431 – Standard resolution as used on the BBC television computer programme £175
- 1451 – Medium resolution, suitable for word processing in mode 0 £225
- 1441 – High res, exceeds the capabilities of the BBC micro £359
- 1431AP RGB + PAL and AUDIO £199
- 1451AP RGB + PAL and AUDIO £255
- **2030 CS 20" Med Res £380**
- **2040 CS 20" Hi Res £675**
- Dust Cover for Microvitecs £5.50
- Touchtec 501 Touch Screen £239

TAXAN 12" & 14"

- **TAXAN Super Vision 2 Type 620** Hi-res RGB Colour monitor. Ideal for Wordprocessing £269
- **TAXAN Super 3, Type 625** Ultra Hi-res, RGB Colour) Text mode switch allows monochrome text display in Green, Amber, White reverse or White on Blue £319
- **TAXAN 14" Multisync 770 Plus** – An autoscanning Ultra high res, colour monitor. Ideal for Archimedes £495
- **NEC JC-1401P3EE 14"** Multisync Ultra Hi-res Intelligent Colour monitor. Auto scans frequencies between 15KHz to 35KHz. Text switch provides 7 colours for Database & wordprocessor. £495
- **Philips BM7542 12" Paper White** Attractively finished high res monitor. Has an etched glass anti-glare screen and a tilt stand for optimum viewing angle. 1000 x 850 pixels resolution coupled with high contrast makes it ideal for both word pro and graphics. The paper white display is ideal for DTP and CAD. Has a Video/Audio input. **Only £65**

STAR BUY

- **PHILLIPS 14"** Hi-Res, dark glass, attractively finished Colour Monitor – supplied complete with RGB, SKART and Audio/Phono Inputs. A push-button switch toggles between Hi-Res monochrome green text mode and full colour display.

ONLY £195

ZENITH

"Now Test Bureau Recommended for use in Education"

12" high resolution monochrome monitor. Ideal for word processing as its green or amber screen is very restful to read. (These are the same professional quality, stylishly finished monitors as used in the larger Zenith PC Sys.)

- **Green (New Design) Hi-resolution £66**
- **Amber (New Design) Hi-resolution £70**

N.B. carriage on Monitors **£7** (securicor)

SPARE LEADS

BNC Lead for Zenith or Philips	£3
Skart Monitor Lead	£5
RGB lead for TAXAN Monitors	£3

SWIVEL BASES

for Video Monitors

Our professional type swivel bases have front adjustable control. This alleviates the need to lift the monitor when adjusting the viewing angle.

for 12" Monitors **£9** (carr. £2.50)

for 14" Monitors **£12** (carr. £2.50)

Anti-Glare VDU Screen

These extremely effective, easy to install, 12" & 14" VDU screens eliminate harmful glare, improves contrast on colour monitors. Increases productivity in offices. A must for all wordprocessor users. Hundreds of these screens are in daily use in various branches of one of the leading High Street banks. **£12**

Acorn-Olivetti JP101 Ink Jet Printer

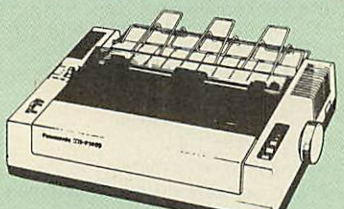
One of the main problems with most printers is that they are hopelessly noisy. How often have you wanted to print something late at night but not done so for fear of waking the children? Also ideal for those working in quiet environments such as libraries, etc. Silence the complaints with the serious solution from Watford at the amazing cost of only **£59**
(Offer valid while present stocks last)

JP101 accepts 9½" standard fan fold paper or single A4 sheets. Tractor & Friction feed supplied as standard – print speed 50 cps.

Pack of 4 refills £12

Screen Dump ROM for JP101 £11

Panasonic KX-P1081



Attractively finished in BBC beige. Bi-directional, logic seeking. Has IBM and Epson RX compatible command calls. Speed: 120CPS draft mode, 24 CPS NLQ mode. Character width range from 5 cpi to 17 cpi. Upto 40 downloadable characters. Functions include, Proportional spacing, Justification, centering and left & right ranging.
(Price inludes, FREE a 4ft Printer Lead, and a Dump Out 3, Screen Dump ROM worth £35 with every printer purchased from us).

Special Price: **£145** (carr. £6)

Optional RS232 Interface: **£39**

Panasonic KX-P1082

This superb printer is very similar to the popular KX-P1081 printer but at 160 cps (40 cps in NLQ), a lot faster.
(Our LOW price also includes £35 worth of FREE BBC Cable and Dump Out 3 ROM).

Introductory Offer: **£172** (carr. £7)

Panasonic KX-P3131 Daisy-Wheel Printer

This low-cost high-performance Daisy Wheel printer is ideal for anyone wishing to produce clear, immaculate letters or reports. It delivers, flawless text at 10, 12 & 15 CPS. Supports proportional spacing. Is Bi-directional, logic seeking. Printing speed: 17CPS. Has 6k printer Buffer. A printer of similar spec could cost a lot more than our ridiculously low price of:

Only **£234** (carr. £7)

Single Sheet Feeder	£175
Tractor Feed	£90

FREE 32K extra Printer Buffer with every KX-P3131 purchased from us this month.

NEC P2200 PINWRITER

24 pin head; 168 CPS, LQ 56 CPS, 8K Buffer, Tractor/Friction feed. Numerous typefaces. **£285**

Cut Sheet Feeder **£59**

NEC P660 PINWRITER

24pin; 216 CPS, LQ 76 CPS, 8K Buffer **£425**

VARIOUS PRINTERS & ACCESSORIES

Brother HR15 RS232 Daisy Wheel	£275
Brother HR20 Daisy Wheel	£349
HR20 Tractor Feed Attachment	£110
Epson EX800 Printer	£395
Epson EX1000 Printer	£539
Epson FX800 Printer	£295
Epson FX1000 Printer	£399
Epson LQ500 Printer	£275
Epson LQ800 Printer	£399
Epson LQ850 Printer	£439
Epson LQ1050 Printer	£529
Epson LQ2500+ Printer	£790
Epson LX800 Printer	£186
Epson SQ2500 Printer	£975
Epson Paper Roll Holder	£17
EX800/1000 Colour Option	£55
EX800/1000 Colour Ribbon	£18
EX800 Cut Sheet Feeder	£130
EX1000 Cut Sheet Feeder	£195
FX/LQ/LX800 Single Sheet Feeder	£135
FX/LQ1000 Single Sheet Feeder	£169
Hi-80 Refills – Set of 4 Pens	£7
LX800 Cut Sheet Feeder	£75
LQ800 Tractor Feed	£44
LQ1000 Tractor Feed	£50
LQ2500 Cut Sheet Feeder	£195
LX1000 Cut Sheet Feeder	£305
Hitachi 672 Colour Plotter	**£475**

(Securicor Carriage on Printers £7)

EPSON PRINTER INTERFACES

All these interfaces fit inside the printer.

RS232	£27	RS232 + 2K Buffer	£52
IEEE 488	£65	RS232 + 8K Buffer	£62

KAGA/TAXAN PRINTERS

(IBM/Epson compatibles)

Kaga KP815 Printer	£249 (carr £7)
Kaga KP915 Printer	£350 (carr £7)
RS232 Interface	£49
RS232 Interface with 2K Buffer	£69
RS232 Interface with 16K Buffer	£89

INTEGREX COLOUR JET PRINTER

Colour Jet 132 Printer	£525
Paper Roll	£6
Screen Dump Software	£10
Colour Cartridge	£14
Black Cartridge	£8
100 A4 OHP transparencies	£55

PRINTER SHARERS

(Ideal for School environment)

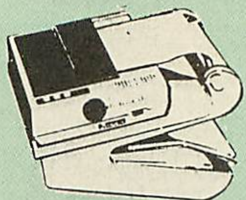
Connects	Serial	Centronics
2 BBC Micros to 1 Printer	£25	£27
3 BBC Micros to 1 Printer	£36	£35
6 BBC Micros to 1 Printer	–	£99

PRINTER CHANGER

3 Printers to 1 Micro (Centronics) **£65**

(Cables extra, specify type required when ordering)

Professional Printer Stand



This new professional printer stand takes hardly more space than your printer. Due to the positioning of the paper feed and re-fold compartments ie. one above the other, the desk space required for your printer functions is effectively halved. Additional facilities include: Easy access to paper from both sides, used with both top and bottom feed paper and with its dial controlled paper feed system with adjustable deflector plates it ensures smooth paper flow and automatic refolding.

£26 (carr. £2.50)

THE EPSON RX-FX-KAGA PRINTER COMMANDS REVEALED

So you bought yourself a new printer, because the salesman in the shop showed you how clever it is and impressed you with all sorts of printouts to show its capabilities – he may even have offered you a special price.

However, now that you have got it home and connected it to your BBC microcomputer, you are wondering how to make it perform these magical tasks. The manual seems to give no clues, and when you type in the example programs, the computer throws the LPRINT statements back in your face.

Now what do you do, when this £400 piece of *high technology* refuses even to move its head, and you have stayed up until 2 in the morning with copious supplies of coffee, desperately trying to print something out. Once again, Watford Electronics comes to your help with our new book entitled 'THE EPSON FX-KAGA PRINTER COMMANDS REVEALED'.

This book describes in plain, easy to understand English, how to use and make the most of your KP810, PW1080A or any other Epson FX80 compatible Printers like Panasonic KX-P1080/1, etc., with the BBC Micro, both from BASIC and Wordwise.

It describes in detail how to obtain the maximum in graphics capability from your printer and includes full indexes allowing you to cross index the numerous commands. Every command is explained in detail, with an accompanying BBC Basic program and an example of its use from Wordwise.

£5.95 (No VAT)

PRINTER LEADS

Centronics lead to connect BBC micro to EPSON, KAGA, SEIKOSHA, NEC, STAR, JUKI, BROTHER, SHINWA, Panasonic etc. printers.

Standard length (4 feet long)	£6
Extra long (6 feet long)	£8
Compact's Special Centronics Lead	£9
RS232 Cable	P.O.A.
IBM Parallel 1 metre Cable	£7
Double ended 36 way Centronics Lead	£9

PRINTER RIBBONS & VARIOUS DUST COVERS

Type	Ribbons	Dust Covers
BBC Micro	–	£3.50
BBC Master	–	£4.00
Archimedes Micro pair	–	£9.00
Brother HR15/20	£3.00	£5.00
EX/LQ800	£7.50	£4.50
EX/LQ1000	£8.00	£5.00
RX/FX80/85/800/MX80	£4.00	£4.95
RX/FX100/1000	£7.00	–
Kaga/Texan KP810/815	£5.25	£4.00
LQ2500	£9.00	£5.50
LX80/86	£4.00	£4.50
LX800	£4.00	£4.75
M1009/GLP	£4.00	£3.75
Panasonic KX1080/81	£4.50	£4.75
SQ2500	£25.00	£5.50
Star NL10	£4.00	£4.50
Microvitec Metal	–	£5.50

Our attractive Dust Covers are manufactured from translucent PVC. The seams are stitched and edges are taped to prevent splitting due to continuous use.

Listing Paper (Perforated)

● 1,000 Sheets 9½" × 11" Fanfold Paper	£7
● 2,000 Sheets 9½" × 11" Fanfold Paper	£12
● 1000 Sheets 9½" × 11" NCR 2 Part Fanfold	£19
● 1,000 Sheets 15" × 11" Fanfold Paper	£9
● 1000 Sheets true A4 Fanfold Paper	£11
● 2000 Sheets true A4 Fanfold Paper	£20
● Teleprinter Roll (Econo paper)	£4

(All our Fanfold paper is Micro perforated leaving a smooth clean edge when the tractor feed strips are detached).

Carriage 1K Sheets £2.50. 2K Sheets £3.00

PRINTER LABELS

(On continuous fanfold backing sheet)

1,000 90 × 36mm (Single Row)	£5.00
1,000 90 × 36mm (Twin Row)	£4.90
1,000 90 × 49mm (Twin Row)	£7.50
1,000 102 × 36mm (Twin Row)	£6.25

Carriage on 1,000 Labels £1.00

MEGABUFFER 256



This new Megabuffer 256 from Watford is a full featured 256K Printer Buffer. It allows the computer to print 256,000 character in a short time thus freeing the computer very quickly. In short it makes light work of printing large documents, screen dumps, etc. It is extremely simple to connect. The features are:

- Low Cost, High performance.
- Improves efficiency by making more efficient use of computer and printer.
- Compatible with any computer and printer that uses Centronics Parallel connections including all BBCs, IBM PCs, etc.
- Total compatibility with all software.
- Cheaper phone bills when using your Modems.
- Ideal for those doing large graphics screen dumps that are slow to print.
- Multi-Copy facility allows you to print several copies via Megabuffer without going through your computer.
- Data Dump facility is included.
- Built in test unit for both the buffer & your printer.

In conclusion it can safely be said that MEGABUFFER 256 is the ultimate printer Buffer for both the amateur and professional user.

Only £125 (carr £2)

OFFICE MASTER



CASHBOOK – A complete "Stand Alone" accounting software package for the cash based sole trader/partnership business. It is designed to replace your existing cashbook system and will provide you with a computerised system complete to trail balance.

FINAL ACCOUNTS – Will take data prepared by the Cashbook module and produce a complete set of accounts as following: Trial Balance with inbuilt rounding routine; Notes to the accounts; VAT Summary; Profit & Loss A/C; Balance Sheet.

MAILIST – A very versatile program. Enables you to keep records of names and addresses and then print, examine, sort and find them, all with special selection techniques.

EASILEDGER – A management aid software tool designed to run alongside an existing accounting system. Essentially a Debit/Credit ledger system which can handle sales, purchase and nominal ledger routines to provide instant management information.

INVOICES & STATEMENTS – Greatly reduces the time and cost of preparing Invoices and Statements by storing essential information like customer names, addresses and account numbers. Has VAT routines and footer messages facility.

STOCK CONTROL – Allows you to enter stock received, stock out, summary of stock items and current holdings together with details of total cost, total stock to minimum level, units in stock ordering, quantity and supplier detail.

All this for only **£21** (Disc)

OFFICE MATE



- DATABASE
- BEEBCALC SPREADSHEET
- BEEBPLOT GRAPHICS

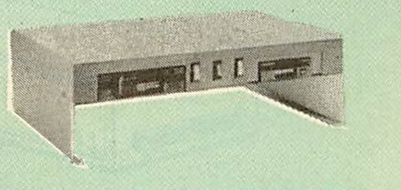
DATABASE – Set up a computerised card index system with powerful search facilities.

SPREADSHEET – Offers many calculation and editing features.

BEEBPLOT – Provides visual representation from Spreadsheet data.

OFFICE MATE Only £10 (Disc)

New Launch Offers
Disc Drives DP35-800S



A Double disc drive – with a difference! Times are changing fast for the floppy disk, and whilst the current standard for the BBC B and Master Series is the 5.25 inch disk, the standard for the future will most certainly be the smaller; faster and more reliable 3.5 inch disks – now a standard feature of both the Master Compact and the Archimedes Series.

To support the present disc drive users, and cope with the future, we have designed our own plinth-mounted disk system – called the DP35 800S, it contains both the 5.25 inch and the 3.5 inch drive formats as well as offer a firm and rigid support for a monitor on top. With the BBC Micro underneath, the plinth makes a surprisingly small footprint on the desk – leaving you more space to work with.

The 5.25 inch disk drive is 40/80 track switchable, and has its very own power supply running independently of the BBC Micro.

Watford's new plinth enables users to read, write and format disks both in DFS and ADFS format – currently the accepted standard for the Master Compact and the Archimedes, it also enables the user to read disks written for the Archimedes. Ideal for both BBC & Master.

Launch Offer: **£165** (carr. £7)

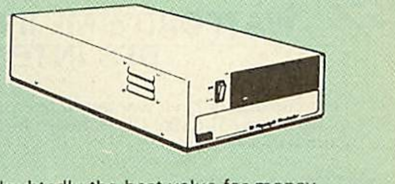
OKIMATE COLOUR PRINTER

The first ribbon transfer printer in its price range which offers fully versatile colour or black printing. A 24 element print head produces more than 100 shades with exceptional clarity. Ideal for use with Quest Paint or AMX Super Art.

Only: **£139**

BBC Screen Dump	£10
Colour Ribbon	£6
Black Ribbon	£6

30 Megabyte Winchester Drive



Undoubtedly the best value for money Winchester Hard disc available anywhere for the BBC Micro.

This 30 Megabyte hard disc is completely compatible with the Acorn ADFS – that's why we have bundled it with each Winchester drive, along with a full user guide and full utilities including file copy, 1000K save routines, Format and Verify – in fact all you need and more.

Finished in rugged metal and fetching BBC beige, the Winchester has an internal fan, so quiet you won't even hear it! A switched mode power supply and a neon-lit on/off switch are there along with a light on the hard disc to tell you when it is working – just compare the price with our competitors' 20 or 28 Mbyte discs!

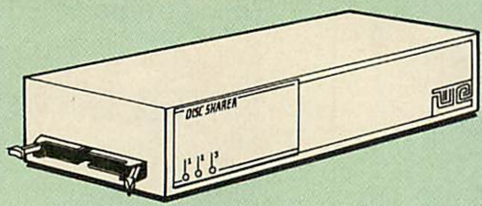
Compatible with the Master, and the BBC B (with 1770 disc interface).

Launch Offer **£425** (Carr. £12)

Panasonic KX-P1083
Fast 240CPS (48CPS NLQ);
8K Buffer, Epson compatible, etc.
Launch Offer: £299

NEW

DISC DRIVE SHARER



(Ideal for educational establishments)

At last, a low cost alternative to the Econet system. Watford's Intelligent Disc Drive Sharer allows you to connect 3 BBC micros (model B, B+ and Master series) to a single or double disc drive. Running under any DFS or DDFS, this intelligent unit will automatically queue the computers. Each computer has a status light dedicated to it. If it is green you will get immediate access to the disk, and red means that you are next in line. The unit plugs directly into the disc drive socket on each computer and is powered by the mains. (N.B. Not for use with ADFS.)

Launch Price: **£59** Price includes 3 Cables

NOW WITH EXTRA FEATURES AT NO EXTRA COST – Watford's latest DFS 1.44

- Incorporates Acorn's Official Tube Host Code so that those with 2nd processors no longer need to waste a ROM socket on the DNFS.
- Option to DOUBLE the speed of BPUT and BGET.

If you already have the Watford Electronics DFS and wish to incorporate these new facilities then simply return your existing DFS ROM to us together with £5 remittance for an upgrade. Please pack the ROM securely and address the package to our Upgrades Dept.

WATFORD's & ACORN's SINGLE DENSITY DFS

Watford's popular and widely acclaimed DFS has now been available for five years and has gained a large following amongst serious and educational users of the BBC Micro. Owners of Acorn or any other standard DFS can upgrade to our "Ultimate" DFS merely by replacing their DFS ROM. See below for this upgrade. ***(P.S. Watford's highly sophisticated DFS is fully compatible with Acorn DFS). (not Acorn's 1770 DFS)***

- *Complete Disc Interface Kit including DFS ROM and fitting instructions* **£78**
- *Acorn's 0.90 DFS Kit complete* **£79**
- *DFS Manual (Comprehensive)* *(no VAT)* **£6.95**
  (P.S. Our DFS manual is the only comprehensive Manual available for the BBC micro and covers both Acorn & Watford DFSs).
- *Watford's sophisticated DFS ROM only* **£16**
- *We will exchange your existing DFS ROM for Watford's Ultimate DFS ROM for only* **£12**
- *DNFS ROM only* **£17**
- *ADFS ROM only* **£25**

NEW

WATFORD's Mk II Double Density DFS INTERFACE

Many of our customers have wanted to use our superior DDFS and Acorn ADFS together. Now our MkII DDFS board has been adapted to allow the use of Acorn ADFS as well.

Added features include:
- Acorn ADFS compatible – Use ADFS on our DDFS board.
- Tube host Code – No longer any need to have the DNFS in your machine to use Co-Processors, even the CoPro and Master 512.
- Auto 40-80 Track sensing – no need to fuss with 40/80 track switches (even works with protected disks).
- An extremely powerful 8271 emulation – ensuring compatibility with almost all software.
- New low profile – small footprint board.
- Fits with all third party ROM boards.
- Option to double the speed of file handling operations – BPUT and BGET.
- Operates in both single and double density modes.
- OSGBPB has been recoded, increasing still further the speed of file handling.

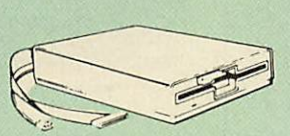
Please note that not all DDFS's are capable of providing either the full 80% storage increase or of allowing a file the full size of the disk – Ours allows both of these!
If you already have a DDFS (any manufacturer), and wish to upgrade to our MkII version, then simply return your existing ROM and DDFS board and we will supply the new DDFS for only **£30.00**.

- Special introductory offer **£39.00**
- DDFS Manual (No VAT) **£6.95**
- We will exchange your existing DFS Kit for our sophisticated DDFS for only **£25.00**

Please note, as the MkII DDFS is a hardware and software upgrade, it is not possible for existing Watford DDFS users to simply exchange their ROM for the new version.

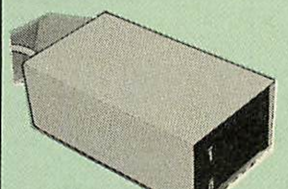
SPECIAL DISC DRIVE/DDFS OFFER

Type CLS400



- The popular Mitsubishi 400k Single Disc Drive, Double Sided, cased with Cables. Plugs directly to your Micro.
- Watford's popular DDFS Disc Interface (allows 720k storage). Will run in both Single and Double Density modes 40/80 track Software switchable.
- A comprehensive User Friendly Manual.

A Bargain at Only **£130** (£6 carr)
(Offer valid while stocks last)



3½" DISC DRIVE OFFER

These top quality 3½" Double sided, 80 track, 1 Megabyte (unformatted each Disc Drives), are attractively finished in BBC beige. They are supplied complete with all cables and a Utilities Disc. They run directly from the BBC B/Master's own PSU.

- Single 400K Drive **£69**
- Twin 800K Drives **£126**

Mysteries of Disc Drives & DFS Revealed

Are you tired of faulty cassettes, and lengthy loading times? Do you want to upgrade your BBC micro to take discs but you get tied up in the plethora of jargon surrounding the choice and use of these systems.

Then The Mysteries of Disc Drives and DFS Revealed is the book for you. It explains in detail the different types of systems available, how they are installed and how to use them. Many examples are given including pre-written programs to call various functions of the DFS available only through Operating System calls. Different types of disc, 40/80 tracks etc. are all explained. This book is ideal for the beginner confused by the plethora of choice available in the marketplace.

£5.95 (Book No VAT)

DISC ALBUMS

Attractively finished in antique brown leather look vinyl. Stores upto 20 Discs. Each disc can be seen through the clear view pocket.

£4

FLOPPY HEAD CLEANER KIT

The heads in floppy drives are precision made and very sensitive to dirt. The use of a cleaner Kit is a sensible precaution against losing valuable data. It is recommended to clean the drive head once a week. It is very simple to use. Available in 3½" & 5¼", please specify.

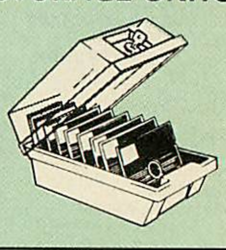
£6

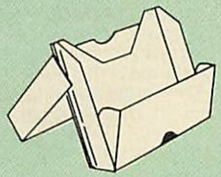
ANTISTATIC LOCKABLE DISC STORAGE UNITS

Gives double protection – Strong plastic case that affords real protection to your discs. Antistatic helps avoid data corruption whilst in storage. The smoked top locks down. Dividers and adhesive title strips are supplied for efficient filing of discs.

- **M35** - holds upto 50 5¼" discs **£6.00**
- **M85** – holds upto 95 5¼" discs **£8.00**
- **M25*** – holds upto 25 3½" Discs **£5.50**
- **M50** – holds 50 3½" Discs **£7.50**

* Not lockable





PLASTIC LIBRARY CASES

Holds up to 10 5¼" Discs. **Only £2.00**

DISC PLONKER RACK

When using ones micro, there is a tendancy to have more than one Disc on the desk. This exposes them to the hazards of fingerprints, scratches, dust, coffee and an untidy desk.
Why not protect your valuable data from all these hazards with the help of our extremely handy and low cost DISC PLONKER RACK. It holds up to eight 5¼" Discs.



Protection at Only: **£2**

DUST COVERS (For our Disc Drives)

Single CLS (without PSU) **£3.20** Twin CLD (without PSU) **£3.85**
Single CS (with PSU) **£3.95** Twin CD (with PSU) **£3.90**

Quality Disc Drives from Watford

To help you decide which drive is the most suitable for your needs (and your pocket!), we have produced the table below.

The first capacity given in the first column indicates capacity in single density mode. That within the brackets is the capacity in double density mode. All disc drive type numbers start with the prefix "C".

The tinting on some of the boxes is used to indicate which Drives are 40 track (non-tinted) and which are 80 track (tinted). All our 80 track drives are already fitted with a 40-80 select switch.

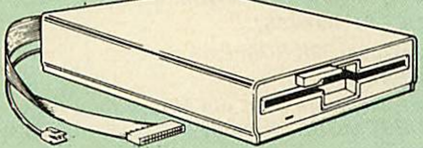
All our Disc Drives are Double Sided and will operate in both Single and Double Density modes. *Extensive experience of the usage of disc drives suggests that the JAPANESE drives currently represent about the best in terms of speed, reliability and overall "elegance" available for the BBC Micro.*

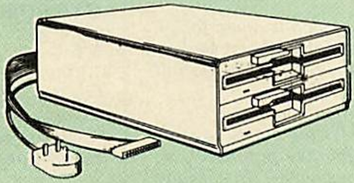
Various other "manufacturers" of disc drives for the BBC micro (more accurately, "packages" label other manufacturers drives with their own name). We buy the high quality JVC and Mitsubishi drives in large quantities directly from the manufacturers, package them and sell them at "dealer" prices direct to the public.

If you look around the popular BBC micro press, you will find that the prices we quote for the top quality, new slimline disc drives are, virtually without exception, some of the best around. These prices, coupled with the backup of one of the country's largest distributors of BBC peripherals provides a superb deal.

Unless you anticipate using dual drives in a fully expanded BBC system for long periods of time with little ventilation, then we suggest that our range of "CL" disc drives without the PSU (Power Supply Unit) would be quite adequate (extensive tests within our workshops have confirmed this). All drives are supplied complete with a SPECIAL UTILITIES Disc, Cables and Plugs. The Drives with power supply have a mains moulded plug for safety purposes. Ideal for Schools & Colleges. We are now able to supply all single disc drives with Power Supply, in either single or dual case. (Dual case has a twin data cable and a power supply capable of driving two disc drives) allows easy expansion to a dual drive unit, at a later date. Prices stated in the pricing boxes below are for single drives in standard single cases. Single drives in a dual case cost an extra £5. (At Watford we anticipate your needs of tomorrow, not just today)!

When using a BBC Micro, most people find themselves short of desk space. The Watford's BBC Micro plinths form an ideal way of recovering some of this precious space) your BBC, Disc Drive and Monitor can all occupy the same vertical footprint and still be comfortably situated. With the Watford Double plinth, your Disc Drive is mounted vertically at one side, leaving a very valuable area directly in front of you for such useful items as spare discs, pen, paper, reference manuals, etc. Follow the trend with Watford plinth. (Turn to the 6th page of our advert for the Plinths).
P.S. All our 5¼" Disc Drives with PSU are compatible with the Compact Micro. All you require is the special Compact Disc Drive Cables designed by us.





Capacity	Drives without P.S.U.		Drives with P.S.U.	
	Single	Twin	Single	Twin
200K (360K)	CLS 200 £89		CS 200 £98	
400K (720K)	CLS400S £89	CLD 400 £168	CS 400S £99	CD400 £188
800K (1.44M)		CLD 800S £169		CD 800S £188

● TWIN Disc Drive Case, complete with Power Supply & Cables **£43**
Securicor carriage on Disc Drives £5 to £6

*Prefix **C** = Cased Drive*
L = Less PSU
S = Single
D = Double

*Suffix **S** = 40-80 Switchable*

e.g. CLS400S = Cased Disc Drive, Less power supply unit, single 5¼" 400K, (720K in double density); Double sided; 40/80 track switchable.

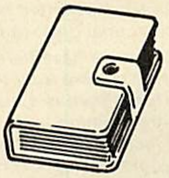
Cable to connect 5¼" Disc Drives to BBC Compact
Single £9 Twin £12
Special Cable to connect both 3½" and 5¼" Disc Drives simultaneously to the BBC Compact £13

3M – DISKETTES

3M – SCOTCH Diskettes with Lifetime warranty from Watford Electronics your 3M Appointed Distributor.

- *10 × 5¼" S/S D/D 40 Track Diskettes (744)* ***£8.00***
- *10 × 5¼" D/S D/D 40 Track Diskettes (745)* ***£9.75***
- *10 × 5¼" S/S D/D 80 Track Diskettes (746)* ***£12.50***
- *10 × 5¼" D/S D/D 80 Track Diskettes (747)* ***£12.75***
- *10 × 5¼" 1.6M D/S D/D High Density Discs for IBM XT and AT* ***£28***
- *10 × 3½" S/S D/D 40/80 track Discs* ***£13.50***
- *10 × 3½" D/S D/D 40/80 track Discs* ***£15***
- *10 × 3½ High Density Diskettes* ***£43***

FREE



This extremely useful and attractive Personal Leather Organiser worth upto £50 is yours when you buy from us, 5 Boxes of any of the 3M range of Discs that we advertise above.

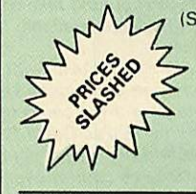
TOP QUALITY 3½" & 5¼" DISKETTES

To complement the range of quality discs and disc drives that WE already sell, WE are now supplying some special offer packs of 10 high quality discs. Each Disc has a reinforced hub ring and carries a lifetime guarantee. These are supplied complete with selfstick labels and packaged in an attractive plastic library disc box. We strongly recommend these Discs.

- *10 × **M3** 3½" D/S D/D 80 Track Discs* ***£15***
- *10 × **M4** 5¼" S/S D/D 40 Track Discs* ***£6.50***
- *10 × **M5** 5¼" D/S D/D 40 Track Discs* ***£8***
- *10 × **M7** 5¼" D/S D/D 80 Track Discs* ***£9***
- *3" Double Sided Discs* ***£3 each***

Special BULK OFFER on 5¼" DISCS

(Supplied packed in Anti-Static Lockable Storage Units)
(Lifetime warranty on Discs)



BULK PACK DISCS in lots of 100

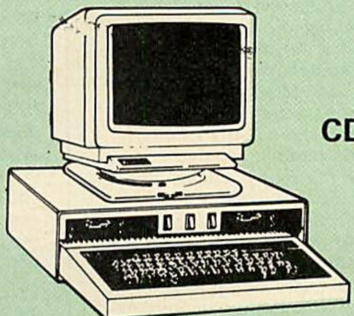
Type	S-S 40T	D-S 40T	D-S 80T
● Without Sleeves	£35	£39	£45
● With Sleeves	£38	£42	£48



WATFORD's WINCHESTER DRIVES

- 10 Megabyte Unit with ADFS **£375**
- 30 Megabyte Unit with ADFS **£449**

(Supplied complete with utilities software)

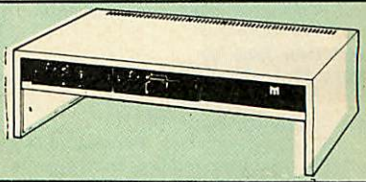
CDP800S  **CDPM800S**

Twin 800K Double sided 40-80 track switchable disc drives mounted in an attractively finished Beige colour plinth for the BBC Micro. Supplied complete with integral power supply, cables and Utilities disc. The switches are mounted on the front panel for ease of use.

CDP 800S for BBC Micro £192
CDPM 800S for Master £196
(Securicor Carr. £7)

(The above drive units are 2 Megabytes unformatted)

ACORN'S Twin 800K Disc Drives



Specially mounted side by side in a Master Plinth. Supplied complete with Cables. Plugs directly to the Master Computer.
RRP £350

Our Price: Only £175
(carr £7)

Continued →

NOMINATED FOR MICRO COMPUTING BRITISH AWARDS 1987

QUEST MOUSE

QUEST MOUSE

The ultimate in Mouse technology, the Watford Electronics Quest Mouse must be the most powerful Mouse package yet produced for the BBC Micro. Featuring state of the art 32K ROM software the Quest Mouse package is filled with features essential to the budding artist. The Quest Mouse is a high precision, low profile and large footprint mouse. It has three large comfortable buttons and its RUBBER COATED STEEL BALL is smooth and easy to use on virtually any work surface. This also eliminates any directional bias that one encounters on the most well-known mouse for the BBC. The Quest Mouse is FULLY HARDWARE COMPATIBLE with the AMX MOUSE so that it will work with any of the AMX range of software.

The two parts of the Quest package are available separately so that existing Mouse owners can upgrade to the Watford's sophisticated Quest Paint software or replace their existing worn out mice for a minimum cost.

QUEST PAINT

The Quest Mouse software is supplied on a PALPROM unit to allow the sophisticated 32K program to be used from a single ROM socket. It is compatible with the BBC B, BBC B Plus and BBC Master Series machines.

The software is used to draw high resolution Mode 1 pictures in full colour. All menu selection and control of the drawing process is performed with the mouse so that you will hardly ever touch the keyboard.

SOFTWARE FEATURES

The software is far too powerful for us to describe it fully in such a small space. Below is a list of the various features. Please write to us for a fully descriptive leaflet.

Disk interface not required. Utilities disk has facility to create and print big screens. Colours applied can be solid, either pattern of user defined pattern. Drawing can use brush or airbrush. Brush shapes can be defined and stored. Airbrush sprays colour/pattern randomly with four jet sizes and even or center spread. Colour cycles. Colour protection to stop particular colours from being overwritten by selected drawing actions. All standard drawing facilities like: rubber, straight pencil lines, triangles, circles, ellipses, rectangles, parallelograms, polygons, etc are provided. All shapes can be solid or just a boundary line. Once a shape has been set up it can be repeated anywhere on the screen. Global colour replace in a rectangle. Powerful fill facility for areas and vertical/horizontal lines. Full cut and paste of rectangular areas with rotation and size with screens from Watford Beeb Video digitiser. Load and Save screens with colour pallet information, save brush and pattern definitions etc.

Take The Guesswork Out of Selecting a Mouse Package

With reviews like this how can you go wrong.

Popular Computing Weekly, 9-11 June '87

"What you actually get for your money is a well built, three button mouse (far superior to the AMX mouse)."

"Overall the combination of a quality mouse and decent art package gives Watford Electronics a real chance of supplanting AMX as mouse supremos."

Micro User June '87

"Quest Mouse and Quest Paint can hold their heads high in the market. . ."

A&B Computing June '87

". . . Watford Electronics, a company famed for excellent hardware add ons and versatile software packages. Called Quest mouse, "this is a very special mouse driven drawing package..."

". . . you will have one of the most comfortable and professionally built mice I have used in a long time. The buttons are responsive, the mouse movement is smooth and without directional bias – a pleasure to use."

"What we have here is probably the best art package there is for the BBC Micro . . ."

"Quest Paint is a major leap forward in BBC programming. . ."

"Quest Paint is an original piece of programming, it is friendly and well endowed with many useful facilities. I would comfortably say it is easier to draw good pictures with Quest Paint than it is with more expensive 'Professional' art packages for the Atari ST and the Commodore Amiga. A recommended buy if you are looking for the best in BBC micro based art packages".

Acorn User, September '87

"The mouse (Quest) performs well in the face of competition from AMX, Wigmore and the rest . . ."

". . . this package represents excellent value for money. If you are interested in art then this program is for you to buy".

"Given time, I can see no reason why Quest Paint shouldn't take on the title of the definitive art package available for the BBC Micro to date".

"All in all, Quest Paint is a very professional package. It contains virtually every feature the budding artist could require".

"What makes Quest Paint so versatile is the addition of a sub-menu which allows you extensive control over each function".

"Until recently, Superart from AMS had been judged as the definitive mode 1 graphics package for the BBC micro. But now it has a serious rival in the form of Quest Paint, from Watford".

"As a measure of what is contained within Quest Paint, I would say it had all the features of Superart plus . . ."

"In most art packages, provision is given for drawing triangles and rectangles. Quest Mouse goes 14 better, allowing any regular polygon of upto 16 sides".

"One facility, not found on any other Art package to my knowledge, is the ability to access a digitiser from within the program". The reviewer concludes by saying, "The result is an extremely comprehensive and professional art package".

John Kilby, Head of Computer Science, Bishop Wulstan High School, Rugby, writes:

"Quest has been an excellent piece of equipment. The problem that seems to occur everyday is that at lunchtime the pupils rush to the computer room to make sure that they are first in the queue for the 'Quest' mouse".

Lt. Cln. C.G. Holton, G2 HQ 1 (BR) Corps, BFPO 39, writes:

"As ever your service is superb and the Quest Mouse proves every bit as good as the adverts claim".

Beeblet User Group, New Zealand Oct '87:

"One of its nicer features is that the top menu is done in Mode 0, the drawing itself is in Mode 1. Thus on screen together are two different Modes. A neat way around an old problem"

"PAN is used when a larger than one screen size image is required. The mind boggles at an A3 size drawing".

"I like it partly because of the mouse itself which is smooth and easy to handle but mainly I suppose because of the features I longed for and previously never got. Its easy to use with almost everything at your fingertips from the mouse. The software is simple where needed and complex where complexity is required".

ConQuest

Watford's Quest package is an extremely powerful and flexible drawing package, with very wide and unusual features. However, since its launch various suggestions for even more advanced & powerful facilities were received from the Quest users. ConQuest allows you these more advanced facilities, like, distortion of a cutout to any shape and a full font designer. If you also have a GXR ROM in your machine or you are using a BBC Master then ConQuest will take advantage of this to give ellipses at any angle, sectors and arcs, etc. Quest combined with ConQuest and Acornsoft GXR ROM make up THE MOST POWERFUL drawing packages available for the BBC range. Quest Paint is able to take advantage of almost any additions to your machine, such as Shadow or Sideways RAM. ConQuest takes this principal even further, by utilising the otherwise normally incompatible Sideways RAM facility by holding pictures in them.

Some of the features are:

- *Pick filenames off the screen for loading and saving.*
- *Rotate a cutout to any angle and Distort it to any four sided shape.*
- *Has Built in Font editor.*
- *Default brushes and patterns on startup.*
- *16 x 16 font available on start up.*
- *Ability to reset patterns, fonts and brushes to default at any time.*
- *ROM based enhanced Epson and compatible printer dump.*
- *ROM based enhanced extended picture routine.*
- *Ability to create and abort extended pictures.*
- *Improved disk access speed for extended pictures.*
- *User definable sideways RAM driver for incompatible sideways RAM systems.*
- *Ellipses at any angle on Master 128 (or B with GXR ROM).*

QUEST MOUSE & QUEST PAINT	£59
QUEST MOUSE, QUEST PAINT, AMX PAGEMAKER & PAGEFONT	£85
QUEST MOUSE ONLY	£29
QUEST PAINT SOFTWARE	£32
QUEST FONT DISC	£12
ConQuest 32K ROM Package	£29
QUEST MAT	£3
Part-exchange your old Mouse for a New QUEST MOUSE for only	£23
GXR ROM for BBC Micro	£22

N.B.

1. Quest Paint supplied complete with Software in a 32K ROM, Comprehensive User Guide and a Utility Disc.

2. Quest Font Disc has 22 text FONTS for use within Quest Mouse.

MARK II LIGHT PEN

Our Mark II Light Pen is the very latest in light pen technology. It is totally insensitive to local lighting conditions and works with many different monitors. The pen only responds to the High Frequency light produced by your monitor/TV. An LED indicates when valid video data is being produced. A conveniently located switch is also fitted.

Price Only £21

(Price includes FREE software Disc and Operating Manual)

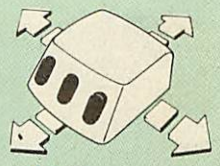
RB2 Marconi Tracker Ball

RB2 (AMX/Quest compatible)	£59
RB2 including Quest Paint	£85

FLEET STREET EDITOR

Software pack for BBC Micro	£33
Software pack for the Master	£39
Software Pack for Compact	£40
Admin Xtra Disc Utility	£13
Walt Disney Disc Utility	£13
Fonts N Graphics Disc Utility	£13

THE NEW Mk III AMX MOUSE



ONLY: £59 Inc. Super Art package
(carr £1.50)
(Please specify for BBC, Master or Compact)

FREE our popular Colour Art software pack worth £15 with every AMX Mouse package purchased from us.

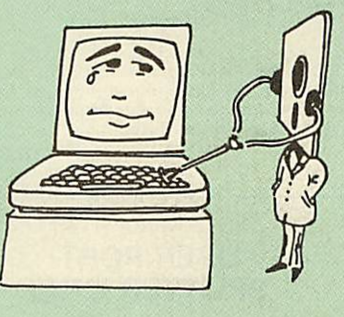
AMX MAT	£3
AMX MOUSE ONLY	£29
AMX DESK Package	£19
AMX UTILITY Package	£11
AMX SUPERART Package	£39
AMX STOP PRESS – A Desktop publising software. Works with Keyboard, Joystick or a mouse	£32

We are giving away absolutely FREE, our PAGE-FONT disc with every purchase of STOP PRESS from us.

PAGE-FONTS – Over 20 Fonts for use with AMX Pagemaker	£9.50

AMX DESIGN (ROM)	£59
AMX 3D ZICON Disc	£19
AMX Database Disc	£19
AMX XAM Educational	£15
AMX EXTRA EXTRA	£19
AMX MAX A gem of desktop (ROM)	£15

DIAGNOSTICS DISC



The BBC Micro is a very complex machine and thus diagnosing a fault can be very difficult.
At Watford Electronics, we realise how difficult it can be when faced with a problem, finding yourself a long way from your nearest dealer, or even just uncertain about your Beeb's health, but not wanting to waste time and money taking it to be looked at.
The solution to these problems is here now, in the form of the Watford's Diagnostics Disc. This excellent utility is specially designed to test out the following areas of your Beeb:
RAMs, ROMs, ULAs, Sound, Keyboard, Disc, RS423, ADC, User Port, Printer Port, Cassette, Joysticks, Speech, Disc Drives, 6502 and Z80 2nd Processors.
This utility is an invaluable aid for all those who take the reliability of their system seriously. A comprehensive manual provides full operating details and a list of possible causes and remedies for any faults that you may find along the way. The package also enables a permanent equipment and service record to be maintained.

Only £20.00

NEW

The WAPPING EDITOR

Watford Electronics bring professional quality Desktop Publishing to the Beeb. The Wapping Editor is a totally self contained mouse-driven desktop publishing package designed to run on the BBC B, B+ and Master computers. The massive 64K ROM contains ALL the software you need to do your own publishing. It 'Brings the Freedom of Press' to your fingertip. The software has a word processor, a graphics package, a page layout section and a font designer. Although very sophisticated, Wapping Editor is simplicity itself to use. Anyone already familiar with Quest Paint will immediately feel at home.

GRAPHICS PACKAGE

Imagine Quest Paint re-written to take advantage of the high resolution of Mode 0, well this is it. The Wapping Editor could well be worth buying for this section alone. This must surely be the ultimate in mouse-driven Mode 0 graphics.

WORD PROCESSOR

This section is a fully functional word processor specially tailored to suit the Desktop Publishing environment. Gone are all the unnecessary and cumbersome text formatting commands – these are dealt with in the 'Page-Layout' section. The features of this word processor include wordwrap, wordcount, insert/overwrite, move block, copy block, delete block, search and replace, browse, etc, many of these features being mouse controlled. Text input can of course be taken from existing word processor files like Wordwise, View, etc, but it is not necessary to have a separate word processor in order to use this package.

PAGE-LAYOUT SECTION

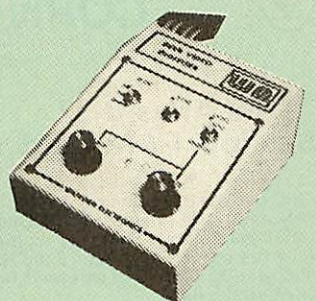
Page Layout becomes easy using these mouse-driven routines. The user simply 'pulls' a rectangle onto the page and states which text document or graphic is required to fill the space – it's as simple as that! Text can be automatically printed in a pre-set number of columns, left justified and/or right justified, or centered. Several different typefaces can be held in memory at one time. Graphics may be stretched, squashed or cropped to fit any size rectangle. Graphics input can be from the software provided in the package or, using the 'mode convert', from any graphics mode screen.

THE FONT EDITOR

This is an enhanced version of the font editor contained in the Con-Quest ROM and allows the editing of ALL 95 characters. As well as being able to design your own typefaces, fonts from other DTP packages or from Quest Paint may be loaded into the editor and converted for use with the Wapping Editor. This sophisticated editor has numerous functions including slide, flip, invert and rotate individual characters or the whole font. Individual characters can be mirrored or copied and a mask feature allows you to superimpose two characters. Lines and columns can be inserted or deleted allowing the character to be stretched or squashed. This font editor will also allow 'font' and 'brush' files to be designed for use with Quest Paint.
This package is the latest in the line of integrated professional quality mouse-driven software from Watford Electronics, the company that adds Power to Beeb.

P.S. For details on Quest Paint and ConQuest, please refer to Page 7 of our advert.

BEEB VIDEO DIGITISER



Using any source of composite video (colour or monochrome) and the Watford Beeb Video Digitiser, you can convert an image from your camera into a graphics screen on the BBC Micro.
This uses the full graphics capacity of the BBC micro in modes 0, 1 or 2. The video source may be a camera, video recorder or television, and is connected via the video output socket.
Images produced can be compressed, stored to disc, printed on an Epson compatible printer, directly used to generate graphics, analysed for scientific and educational use or converted to other formats e.g. Slow Scan TV or receiving a picture from a remote camera using a modem.
The output from the digitiser exactly matches the graphics capability in each mode, with up to 8 levels of grey in mode 2. The unit connects into the User Port and automatically scan$ a complete picture in 1.6 seconds.
Both the black and white levels can be adjusted manually for the optimum picture, or switched to automatic for unattended use. The image produced can be reversed if necessary.
Full controlling software is supplied on a normal sideways ROM and this is easily accessed via additional * commands. The package i designed to allow easy input of complex screens and give full access of the data to the user. Once on the screen, the image can be used as a normal graphics screen, allowing any of the usual graphics commands in BASIC or other ROMs to work on it.
A special print dump routine is included with the driver programs. This is specially designed to produce a fast, correctly proportioned picture, with reduced "contouring", resulting in an accurate reproduction of the original image.
Detailed examples of driving this unit from BASIC or other languages are all provided in the extensive manual supplied.

£109 (Carr. £3)

(Price includes) Digitiser Unit, Software in ROM & a Comprehensive Manual)
(BBC B+ and Master compatible, except Master with Econet)

Magazine Maker

(As seen on TV)
A combination of the Pagemaker and Watford's Beeb Video Digitiser.
Using any video that provides a composite signal and the digitiser, images from a camera or TV can be converted into a graphics screen on the BBC Micro.
They can then be used within Pagemaker to illustrate magazines or newsletters – in fact anything that needs to be created on A4 size paper.
With Pagemaker's many features, a variety of pictures can be composed – the only limit being the imagination.
Pictures can be doctored using Pagemaker's graphics option to produce any number of effects.
Text can be formatted around the digitised photo on screen using the facilities available, which include 16 typefaces, character and pattern definer, text formatting and the ability to load in mousefiles and viewfiles plus much more.
Once created the picture can be printed out.
The Magazine Maker is suitable for any use that requires illustrated documents.

Complete Package **£135.00** (carr. £3)

Continued →

ARIES CORNER

The Aries B-32 Shadow RAM Card

Like the BBC B+, the B32 provides 20k of shadow screen RAM and 12k of sideways RAM. Unlike the B+, the B32 has simple software commands which allow the user to reconfigure the RAM as 16k of shadow RAM and 16k of sideways RAM, or all 32k as sideways RAM.

With the B32, the programmer gets up to 28k of RAM available for Basic, Logo, Comal, Forth, Lisp and BCPL programs in any screen mode. The business user gets extra memory for View, ViewSheet, Wordwise Plus, Interword and many other applications. For advanced applications, the scientific user gets access to a massive 47k of data storage using the Acorn approved *FX call.

Sideways RAM enables you to load sideways ROM images from disc, allowing you to have a large library of sideways ROMs (subject to the copyright holder's permission) stored on disc. The B32's sideways RAM can also be used to extend any operating system buffer (such as the printer buffer) or to load tape programs into a disc system.

The B32 simply plugs into the 6502 processor socket on your BBC micro – no flying leads to connect and no soldering. Provision of the on-board ROM socket means that the Aries-B32 control ROM does not use up one of your existing ROM sockets.

- Recommended by Computer Concepts for use with their Inter series of ROMs.

Price: **£80** (carr. £2)

CREDIT CARD 24 HOUR Ansaphone Hot Lines (0923) 50234 or 33383

Aries B-12 Sideways ROM Board

This board is extremely well made, simple to install, reliable when fully loaded and compatible with the Aries-B20 and the Aries-B32.

The B12 provides a total of twelve sideways ROM sockets (the four in the original machine are replaced by the twelve on the board), all fully accessible by the MOS sideways ROM system. In addition, there are two sockets for sideways RAM, giving up to 16k of RAM using 6264 static RAM chips.

The B12 system consists of two parts: a large detachable "mother board" which carries the extension ROM sockets and a small "base board" on a short ribbon cable, which plugs into the existing sideways ROM sockets. This two-board design eliminates the reliability problems previously associated with some other ribbon-cable based systems.

If you do not have a B32 or B20, a small adaptor module (the Aries-B12C) is available at a nominal cost.

Price:	Aries B-12	**£40**
	Aries B-12C	**£5**

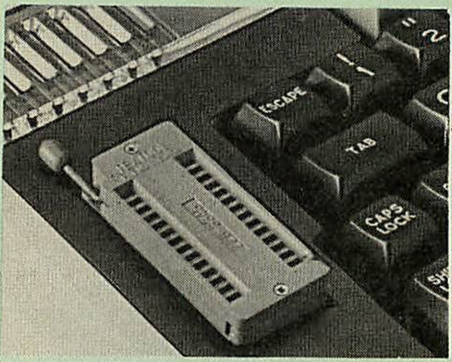
ARIES B-488 IEEE-488 INTERFACE UNIT

The Aries-B488 is an interface unit to enable the BBC micro to control and monitor IEEE-488 bus systems. The IEEE-488 bus (also known as the 'GPIB' or 'HP-IB') is the standard method of interconnecting programmable laboratory instruments and control equipment. Using the B488, up to 15 devices may be connected in a single high-speed data network.

£238 (Carr £3)

All prices in this advert are exclusive of VAT.

SIDEWAYS ZIF SOCKET



Allows you to change your ROMs quickly and efficiently, without opening the lid. The ZERO INSERTION FORCE (ZIF) socket is located into the ROM Cartridge's position.

- Very simple to install. NO SOLDERING required. The ZIF (Zero Insertion Force) eliminates the possibility of damage to your ROM pins when inserting & extracting.
- The low profile of the socket allows unrestricted access to the Keyboard.
- All data and address lines are correctly terminated to ensure correct operation of suitable ROMs with the BBC micro. We also supply a purpose designed see-through storage container with anti-static lining, allowing you to store up to 12 ROMs, protecting them from mechanical and static damage.
- This versatile hardware solves the problem of running out of socket space. Simply lift the ROM from the ZIF & insert a different one (No pulling or pushing of Cartridges. It is a must for all professionals and Hobbyists alike.)
- BBC, B+ and Master compatible.

ONLY **£15** (carr £2)

Low Profile CARTRIDGE SYSTEM

Complete System consists of: Low profile ROM Cartridge, Socket housing, Cable assembly, 5 labels and a library storage rack for the BBC B.

Complete System	**£11**
Spare Cartridges	**£2.50**
Spare Rack	**£1.50**

ROM Cartridges for the BBC Master
Twin £7.50; Quad £12

16K Sideways RAM Modules

Complete with such features as read and write protection, these new modules from Watford Electronics are ideal for the hobbyist, software developer and ROM collector.
Key points to note about this new addition to the Watford range of products are:

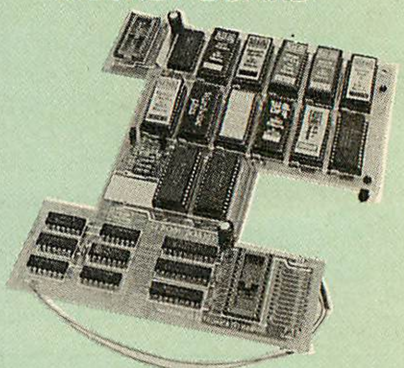
- Write protection (useful in a variety of circumstances).
- Read protection (allows recovery from ROM crashes).
- Compact construction.
- May be fitted in systems even with a ROM board.
- Multiple units may be fitted, even with a ROM board.
- No overheating or overloading problems.
- Free utilities disc supplied.
- Can be used as a 16K PRINTER BUFFER.
- Ideal for professional software development.
- Supplied with utilities software disc.

Only: **£24** (carr £2)

Optional extras

READ and WRITE protect Switches **£2** each
Battery for Battery Backup **£3**

SOLDERLESS SIDEWAYS ROM SOCKET BOARD



In the May 1986 Micro User's independent review, the writer concludes, "The board has been well laid out. Its position is much better than others – not over the HOT RAM chips and further away from the disc controller area". "I give the solderless ROM board the thumbs up and wish it success".

This brand new board from Watford Electronics is designed specifically for those wishing to add a ROM board to their own BBC without the need to perform any soldering.

This new board expands the total possible number of ROMs in a BBC from 4 to 16.

Unlike our competitors inferior boards, the ONLY upgrade required for fitting battery backup to the Watford Solderless ROM board (all Watford ROM boards, actually) is the fitting of the battery itself. (No other expensive components are required.)

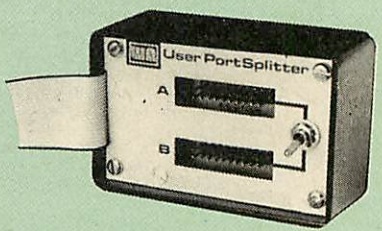
- The key features of this new, no fuss, easy to install quality product from BBC leaders Watford Electronics are as follows:
- Increase your BBCs capacity for ROMs from 4 to 16.
- **No soldering required.**
- Very low power consumption.
- Minimal space required.
- Compatible with Torch, DDFS, RAM Card, 2nd Processor, etc.
- Socket 14 takes two 6264 RAM chips.
- Read protect to make RAM "Vanish") allows recovery from ROM crashes.
- Battery backup option for RAM chips.
- Supplied ready to fit with comprehensive instructions.

Price: Only £32
Battery backup fitted **£36**
(carriage £2)

- Sideways RAM Utilities Disc for Solderless ROM Board. Includes the options to load and save ROM Images and the facility to use Sideways RAM as Printer Buffer.

Only: £8

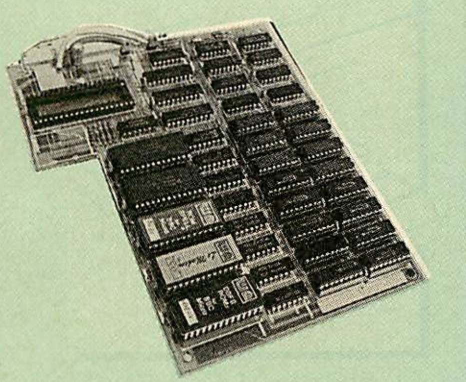
USER PORT SPLITTER UNIT



Gone are the days when you had to plug and unplug devices from the User Port. This extremely useful little device allows two units to be connected to the User Port simultaniously, and select between them simply by toggling a switch. This device is particularly useful for those people using Quest Mouse and the Watford Video Digitiser or any similar combination.

Excellent Value at **£21** (carr £2)

ROM/RAM CARD



Watford Electronics announced the first ever commercial ROM board for the BBC micro, the Watford Electronics 13 ROM Socket Board 3 years ago. Following the success of this board, we have designed what probably represents the ultimate in expansion boards, the new Watford Electronics ROM/RAM board. This highly versatile and sophisticated board represents the latest in "2nd generation" sideways ROM technology for the BBC micro, designed to satisfy the serious BBC user.

- NO SOLDERING required to fit the board.
- NO overheating problems.
- No User Port corruption (avoids problems with the mouse, modems, Eprom Programmers, etc.)
- Fully buffered for peace of mind.
- Firm mounting in BBC micro.
- Compatible with all BBC micros (not BBC+ or Master).
- Total number of ROMs increased from 4 to 8.
- Up to 8 banks of sideways RAM (dynamic).
- Option for 16k of Battery backed CMOS RAM (CMOS RAM needs one ROM socket).
- Software Write protect for ALL RAM.
- Read protect for CMOS RAM (ALLEVIATES crashes during ROM development).
- Separate RAM write register (&FF30 to &FF3F).
- Automatic write to currently selected RAM socket for convenience.
- Accepts any ROM.
- FREE utilities disc packed with software.
- Compatible with our DDFS board, 32k RAM Card, Delta Card, sideways ZIF, etc.
- Large printer buffer.
- UNIQUE Fully implemented RAM FILING SYSTEM (similar to the popular Watford DFS).
- ROM to RAM load and save facilities.

The SFS (Silicon Filing System) can utilise up to the full 128k of RAM (with the SFS in any paged RAM) as a SILICON DISC. This behaves as a disc drive, with all the normal Watford DFS features (including OSWORD &7F for ROM-SPELL, etc.) to provide an environment that looks like a disc but loads and saves MUCH faster.

The ROM-RAM Board plugs into the 6502 CPU socket. This leaves free all the existing ROM sockets, which can still be used normally.

Any ROM that can be plugged into the BBC micro's own ROM sockets may be used in the ROM-RAM Board.

The ROM-RAM Board is supplied with all ordered options fitted as standard. Upgrade kits (with full instructions) are available for all of the options, for later.

Please write in for further details.

INTRODUCTORY PRICES:

- ROM/RAM card with 32k dynamic RAM **£39**
- ROM/RAM card with 64k dynamic RAM **£52**
- ROM/RAM card with a massive 128k dynamic RAM **£80**

(carriage on ROM-RAM Card £3)

OPTIONAL EXTRAS:

- 16k plug-in Static RAM kit £6
- 16k Dynamic RAM for Upgrade £7.50
- Battery backup £3
- Read and Write protect switches ...... £2 each

Complete ROM-RAM board
All options installed £89

P.S.
Is your existing ROM Board overflowing with ROMs? Do you need more Sideways RAM? Is your Board unreliable? Then upgrade to Watford ROM/RAM Board and pay £5 less

Le Modem



The MODEM from Watford

At last a professional MODEM for the BBC Micro. Unlike other 'Modem packages' this is a complete package there are no extra software costs to get 'up and running'. Of course Le MODEM is multi-standard, i.e. 300/300, 1200/75 & 75/1200 UK and BELL (USA) are all supported.

The features that make Le MODEM such good value are:

- *A complete communications terminal that transforms your BBC Micro into a very powerful World-wide data transfer system.*
- *Auto Dials, Auto answers, and is completely controlled by your micro. There are no external controls!*
- *Allows you to access PRESTEL, B.T. GOLD, THE SOURCE, MICROLINK, MICRONET, MICROWEB, THE TIMES NETWORK, MICRO LIVE (BBC TV database), CITY BB and more.*
- *Designed to be SIMPLE but SOPHISTICATED. To LOGON to a data base all you have to know is its TELEPHONE NUMBER, Le MODEM does the rest.*
- *Supplied with a comprehensive telecomms package in a 16K sideways ROM which includes a FULL PRESTEL terminal allowing TELE-SOFTWARE to be downloaded.*
- *A comprehensive 80 column terminal. This includes XMODEM error checked transfer protocol, to allow error free data transfer anywhere in the world!*
- *FULLY controlled by simple *COMMANDS allowing you to control it from your own BASIC programs. To get you started we supply a FREE disc of bundled software!*
- *Connects to the 1MHz bus. A *AUDIO ON-OFF command allows you to actually hear the telephone line through your BBC micro loudspeaker.*
- *Completely self contained with internal mains power supply. (Even a free mains plug is fitted!) A *TEST facility gives ON SCREEN indication that Le MODEM is working correctly.*
- *Packaged in such as way that you need nothing else except a BBC Micro to communicate with computers all over the world.*
- ***FREE Registration to MicroLink.***

SPECIAL OFFER

Price: ***£88***
(carr £3)

(Price includes, Le Modem, Software ROM, Cables & Comprehensive Manual)
(Write in for further details)

Minerva Systems Software

System Delta with Card Index	£55
System Programmers Ref. Guide	£19
System Gamma	£43
System Gamma Prog. Ref. Guide	£19
System Mailshot	£17
System Reporter	£17
System Intrer/View Link	£17
System Sales Ledger	£39
System Purchase Ledger	£39
System Nominal Ledger	£48
System Stock Management	£39
Order Processing/Invoicing	£39

APOLLO

The NEW Modem from Watford

Following numerous requests from you, our discerning customers for an APPROVED, Low Cost & High Performance modem with Auto Dial & Auto Answer facilities as standard) we bring you the versatile APOLLO Modem. Just compare the features and look at the price (which incidentally includes the cost of the Software, manual and BBC connecting cable). We are sure you will agree that Watford Electronics in their traditional way are giving you a super 'value for money' deal.

Just look at these features:

- V21 for Bulletin boards, Microlink, Telecom Gold, etc.
- V23 for Prestel, Home Banking, and other Viewdata services.
- Reverse V23 allows User run Viewdata service.
- 1200-1200 half duplex for communications.
- XMODEM, HEX and ASCII file transmission.
- Auto Dial of given 'phone number.
- Auto Answer for User's Bulletin Board.
- 80 column terminal with split screen facility.
- Prestel text screen dump.
- Fully BABT approved.
- **FREE Registration to MicroLink.**
- **£6.50 off annual Membership to Micronet, Prestel and Telecom Gold.**

The Apollo is attractively finished in matt black. It opens the doors to world communication to both, the Hobbyist and the Professionals alike. With baud rates varying from 300/300 Originate and Answer, 1200/75 and 75/1200 full duplex and 1200/1200 half duplex, virtually all the popular tele-services can be accessed. A comprehensive Comms ROM oversees the use of the APOLLO, providing simple commands for all the software controlled facilities. APOLLO is an ideal modem for both the first time buyer and the seasoned user. Join the Telecommunications Revolution – Buy a Watford APOLLO!

Only: **£88** **(Carr £3)**

Price includes, the Modem, Comm Software Cables & Operating Manual).
(Write in for full specification)

VOLTMACE JOYSTICKS

Delta 3B Single Joystick	£12
Delta 3B Twin Joysticks	£17
Delta 3C Joystick for Compact	£10
Delta 14B Single Joystick	£12
Delta 14B/1 Adaptor Module	£12
Transfer Software Disc-Tape	£7

ATTACHE CARRYING CASE

For the BBC Micro. Attractively finished in antique brown leatherette. Lockable.
Only **£10** (£2 carr.)

Versatile **BEEB SPEECH SYNTHESISER** Unit



The Watford Speech Synthesiser is a very flexible speech synthesis unit based upon the powerful phonemes system. This system stores the building blocks of speech (called phonemes) and allows you to combine them quickly and easily to form virtually any word imaginable.

Supplied with an advanced ROM, you are provided with a 500 word dictionary to get you started. These can easily be added to by following the notes given in the comprehensive manual.

SPECIAL PRICE £32 (carr £2)

Continued

COMPUTER CONCEPT'S ROMS

ACCELERATOR	£48
CARETAKER Basic Utility	£25
DISC DOCTOR	£28
Graphics ROM	£29
TERMI	£25
COMMUNICATOR	£49
SPEECH ROM	£24
Printmaster	£28

Wordwise £24

Wordwise plus £40

We are giving away absolutely **FREE**, the superb Word-Aid ROM worth £24, with every WORDWISE PLUS package bought from us.

Word-Aid

The most comprehensive utilities ROM for Wordwise-Plus

Extend the power of your Wordwise Plus word processor with this most advanced ROM from Watford. By utilising the powerful Wordwise Plus programming language, WordAid provides a whole host of extra features, all accessed via a special new menu option. This ROM has been personally approved by Mr Charles Moir, the author of WORDWISE PLUS.

- Alphabetical sorting of names and addresses.
- Text transfer options.
- Chapter marker.
- Epson printer codes function key option.
- Search and display in preview mode.
- Embedded command removal.
- Print Multiple copies of a document.
- Multiple file options for print and preview.
- Address finder.
- Label printer.
- Mail-merger.
- Number/delete/renumber.
- Clear text-segment area.
- BBC B, B+ and Master compatible.

Only £24

(N.B. Word Aid requires a Disc Interface in your Micro)

HI-WORDWISE-PLUS DISC: £5

SPELL MASTER £42

Inter SHEET ONLY £37

INTER CHART ONLY: £26

Inter-WORD £38

MEGA-3 ROM

Interword, Intersheet & Interchart – 3 in one ROM £82

INTERBASE £49

All Prices Exclusive of VAT

VIEW

VIEW WORDPROCESSOR 2.1	£35
VIEW 3.0 ROM	**£48**
VIEW PROFESSIONAL	**£79**
HI-VIEW (for use with 6502 2nd Processor)	£36
VIEW Printer Driver Generator (Please specify Disc or Cassette)	£9
VIEWSHEET (Acornsoft)	£37
VIEWSTORE	£39
VIEWSPELL with 80 track disc	£29
VIEWPLOT Disc (Please specify for Master 128 or Compact)	£22
VIEW-INDEX	£12
OVERVIEW Packs 1 & 2 for the Master	£72

Watford's own Sophisticated VIEW PRINTER DRIVERS

Epson FX80 & Kaga KP (Disc)	£8
Juki & Brother HR15 (Disc)	£8
Silver Reed Printers (Disc)	£8

ADVANCE COMPUTER PRODUCTS' ROMs

Adv. Disc Toolkit	£29
Adv 1770 DFS for Mast/Compact	£29
Adv 1770 DFS for BBC/BBC+	£29
Adv Disc Investigator	£24
Adv. Control Panel	£29

MINI OFFICE II

DISC Version for BBC B & B+	£14.50
DISC Version for BBC Master	£17.50
ROM Version	£47.00

(When ordering please specify for which Micro & 40 or 80 track Disc).

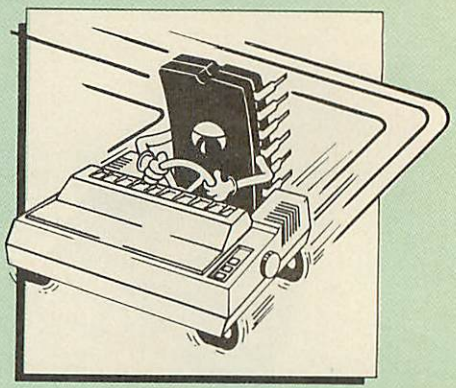
REPLICA 3

This new improved REPLICA 3 from Clares is a very powerful disc based TAPE to DISC Utility. It now transfers even more programs than ever before. Replica 3 will not work with all programs but then neither will anything else. 30,000 Replicas have been sold to date. It has to be good.

£13 (40 or 80 track)

Acorn's Speech Synthesiser package, complete Special Offer £18

VIEW PRINTER DRIVER ROM



View is a powerful word processor, but until now has seriously lacked in terms of printer support. With the launch of our Printer Driver ROM, which includes an extremely powerful and easy to use Printer Driver Generator, View users can find themselves in the realms of advanced word processing only at a small outlay.

The VPD extends View's printer command with a series of mnemonic commands. All standard highlight sequences are also supported. A large range of printers are supported by drivers contained within the ROM (the drivers can be downloaded and customised). Printers supported include: Epson's MX, RX, FX, FX, LX, JX80 range, HI80, KP810/910, PW1080, JP101, HR15, M1009, GLP, Panasonic KX-P1081/2, JUKI 6100, etc.

Other printers are readily supported by defining a Printer Driver using the built in Printer Driver Generator. The features mentioned below are available to both the built in Printer Drivers and user defined drivers (assuming the printer supports the features). NLQ control, Underline, Bold, Proportional Spacing, Microspacing, Italic, Superscript, Subscript, Condensed, Enlarged, Double Strike, Set lines per inch numerically (e.g. LPI 6), Set characters per inch numerically (e.g. CPI 5), Select printer font, Select printer ribbon colour, Translation sequences, Emulation of BBC Character Set, Simple numeric expressions for certain operations, Full printer setup, Send control codes, Print prompt on screen, Redefinable Pad character, Pause for key press, Prompt to change daisywheel, and Execute * command when printing.

Other features include a very powerful on screen preview, with bold, italic, underline, super/subscript, enlarged highlights, and a special printer driver to allow memory based text to be previewed by View 1.4. Of course, View 1.4, 2.1 and 3.0 are all supported, as is Shadow RAM and 6502 Second Processors. The BBC B series and Master series of micros are supported. A comprehensive manual is supplied. All in all, a very professional product for the discerning user who wants power at their finger tips. (Write in for a detailed leaflet).

Price: Only £33



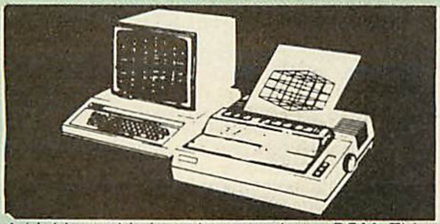
Harness the full potential of your Epson RX or FX printer. The NLQ ROM makes Epson printers produce Near Letter Quality output with optional proportional spacing, enlarged and underlined. Accessed by simple * commands from Basic, Wordwise and View (with driver) or almost any other language.

(Send an SAE for sample printout)

Only: £25

VIEW PRINTER DRIVER for NLQ ROM £7

DUMPOUT 3



A highly sophisticated screen dump ROM. This has to be the most flexible and powerful screen dump ROM yet produced for the BBC micro. It will put on paper anything you see on the screen, including full Mode 7 graphics.
Also provided are window setting utilities and OSWORD calls to plot and read Mode 7 graphics pixels.

Facilities:

- Vertical and horizontal scaling in all graphics modes and mode 7
- Rotation of image by 90, 180 or 270 degrees
- Left hand margin setting
- Screen dump window setting
- Colours appear as grey scale
- Two tone fast dump
- Colour mask
- Mode 7 contrast expansion
- Mode 7 contiguous dump
- Key triggered and User Port triggered dumps

The Micro User Feb. 1985.
'Without reservation I wholeheartedly recommend the Dump Out 3 ROM as the ultimate screen dump facility for the BBC Micro . . . it must represent excellent value for money and surely cannot be beaten".

For use with the following printers:
GLP, GP80/100/250, CANNON, STAR, KAGA/TAXAN, NEC, SHINWA CP80, GEMINI, EPSON MX/RX/FX, M1009, NEC PC8023, DMP100/200/400, Panasonic KX1081/82, Mannesman Tally and compatibles.

Only: £25

BBC SOFTWARE'S Popular Educational Software

- Maths with a Story 1 (Disc). 4 primary level maths programs **£11.25**
- Maths with a Story 2 (Disc) 4 further maths programs **£11.25**
- Picture Craft (Disc) 6 - 14 age group. Pack consists of flexible geometrical design & colouring programs **£17**
- WAVES: Science Topics (Disc) CSC O Level Physics program. **£14.95**
- RELATIONSHIP: Science (Disc) O Level Biology program. **£20.00**
- BONDING: Science (Disc) O Level Chemistry program. **£20.00**
- ELECTROMAGNETIC SPECTRUM (8 Discs) O Level program. **£20.00**
- ELECTRONICS IN ACTION (Disc) O Level program **£19.95**
- NEWTON & THE SPACE SHUTTLE (Disc) O Level program. **£20**
- ECOLOGY (Disc) O Level program. **£20**
- POLYMERS (Disc) O Level program. **£20**
- Clasification & Periodic Table O Level. The suite is supplied with its own database of chemical elements which can be classified according to your own rule. **£20**
- FOOD & POPULATION (Disc) O Level program. **£20**
- MICROTECHNOLOGY (Cassette) O Level program. **£11.25**
- A VOUS LA FRANCE (2 Cassettes) A French language home study aid. **£21.70**
- DEUTSCH DIREKT! (Disc & Audio Cassette) **£19.95**
- Modem Master (Disc) **£11.25**
- ADVANCED TELETEXT SYSTEM **£8.65**
- PERIOD TABLE SOFTWARE **£20**
- Astronomy – Primary (Disc) **£12**
- Computers at Work – Primary **£17.35**
- Introducing Geography – Primary **£17**
- **Introducing Geography 11-17yrs** **£17.50**
- Electric Fields 6-14 years **£11.25**
- BlackQueen Contract Bridge **£13**
- Espana Viva – 3 Discs **£19.95**
- A Vous La France Disc **£21.50**

THE NLQ DESIGNER

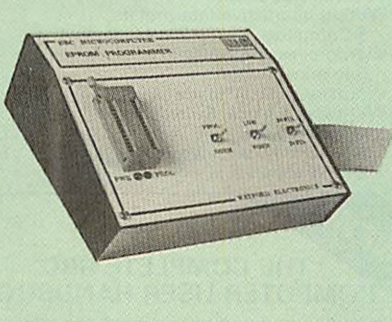
(The First & still the Best)
Supplied with over 25 Different fonts

A massively useful utility for users of the Taxan/Kaga KP810/910 or the Canon PW1080. This program allows you to define NLQ character sets to download into the printer's memory. Full on screen editing of the font. Requires 6264 RAM chip to be fitted in the printer.
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- Programs the following EPROMs: From 2K to 32K: 2516, 2716, 2532, 2732, 2764, 2764A, 27128, 27128A, 27256 (Both 12.5V and 21V).

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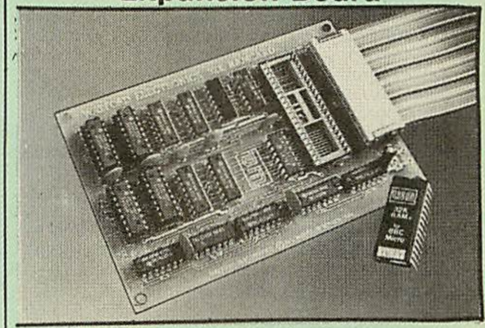
EPROMs need careful treatment if they are to survive their expected lifetime. Over erasure of EPROMs very rapidly turns them into ROMs! The TEX erasers operate following the manufacturers specifications to give the maximum possible working life by not erasing too fast. We use these erasers for all our own erasing work.

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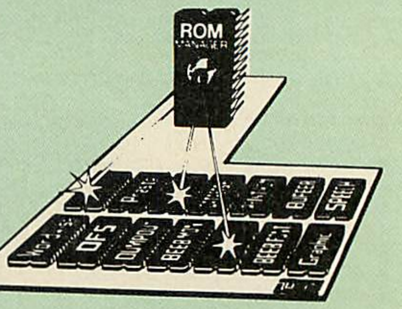


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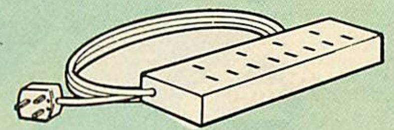
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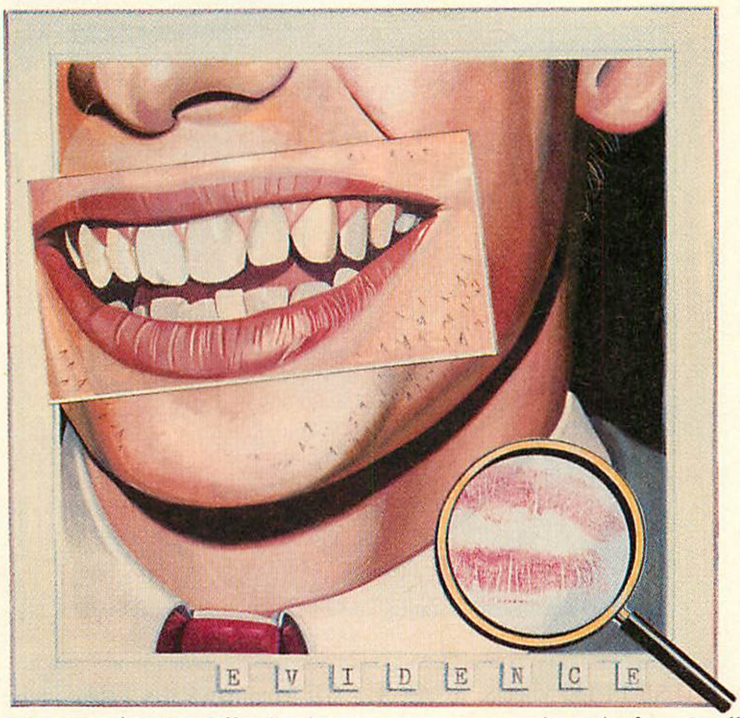
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ELEMENTARY, MY DEAR MICRO

'Intelligent' languages like MicroProlog have been available for the BBC for some time. Our simple version, Micro-Sherlock, demonstrates the ideas involved

David Acton

When artificial intelligence is mentioned most people immediately imagine huge supercomputers determinedly trying to out-think Einstein. But when so-called 'intelligent' programming languages such as Lisp and Micro-Prolog were made available for the BBC micro, it became clear that 'AI' could be attempted even with just a home computer. I want to try to demonstrate how even the humble BBC Basic may be used to write a 'thinking' program. My attempt at this exercise is included as listing 1 on the yellow pages. It is entitled Micro-Sherlock – after the master of deduction!



Just how 'clever' a program is really depends upon how clever you choose to make it. Of course, you are always limited by the capacity of the machine you use, but given this limitation and some care, quite impressive results can be achieved.

In designing Micro-Sherlock, the aim was to provide a 'software platform' which was capable of receiving pieces of information in English and then answering questions about this information. For example, I wanted to be able to type something of the form 'X is Y', and be able to ask questions like 'Is X Y?' All intelligent programs perform this sort of function, and the processes involved can be broadly divided into three groups:

- The interpretation of facts
- The storage of facts
- The evaluation of facts

The first process can prove to be particularly difficult, because we are used to reasoning in English, whereas a computer has no understanding of English syntax or grammar. For example, the opposite of the phrase 'I like spinach' is 'I do not like spinach', whereas the opposite of 'I am hungry' is certainly not 'I do not am hungry' (unless, of course, you did went to the same school as me).

Because English evolved many years before computers were even dreamt of, there is no easy way of getting a computer to understand many English expressions. A compromise must be reached – a sort of 'pseudo-English' must be used. While English words may be recognised, they must be entered in a format that the computer can understand. The simplified form of English falls between the natural language and the computer's own artificial language.

The storage of facts can be a rather simpler process. Before attempting to do this, an expression must first be broken down into its constituent parts – single words. Micro-Sherlock stores all words entered in an array called word$, and thus allocates each word entered with a unique word number. So, if we consider a fact to be made up of three words – 'I like spinach,' for example – then we can store that fact as three numbers. In practice we need to store some extra information about each fact – in order to describe whether it's true or false, whether it depends on something else being true, and so on. But the really 'clever' part of an intelligent program comes with the evaluation of any given query. Often, this is just an exercise in 'list processing' – the systematic examination of a list of known facts to find one that matches the question being asked. However, this task is made more complicated by the use of conditional expressions (eg, if A is B then C is D) – then an 'evaluation path' has to be traced through the lists of facts in order that an answer to a question might be deduced. And of course, if the computer posesses insufficient knowledge to answer a query, the program must be capable of realising that and reporting it.

Micro-Sherlock provides you with a prompt and expects you to enter one of four things:

- A fact to be stored
- A query

ILLUSTRATIONS BY BILL BUTCHER

- A 'keyword' (followed by relevant parameters)
- A star command

Because Micro-Sherlock is relatively unsophisticated, facts must be entered in one of two simple forms. You can use either of these forms:

‹noun› ‹verb› ‹noun/adjective›

‹noun› ‹verb› not ‹noun/adjective›

In fact Micro-Sherlock makes no distinction between nouns, verbs and adjectives. It doesn't have a dictionary against which words may be checked to find their type. A more advanced program could check all words entered and report any words used out of context. Micro-Sherlock merely assumes that all the words you type in are correct and in a relevant context. So, 'I am hungry' or ' I like spinach' are perfectly valid expressions to enter. However, 'I do not like spinach' will not be understood – because it isn't ‹noun› ‹verb› not ‹noun›. In fact the expresson 'I like not spinach' will be expected! This is a rather archaic, though poetic, way of putting things and so two 'keywords' are provided – TRUE and FALSE.

The keyword TRUE takes the expression after it as being true. In practice you will probably not need to use TRUE since all expressions are taken as being true unless otherwise specified. The keyword FALSE is more useful without resorting to middle English! So, instead of typing 'I like not spinach' you can enter FALSE I like spinach – a rather clumsy but nonetheless unambiguous means of specifying that a false statement is false.

Because English is a natural language, a single question can be expressed in many different ways. This makes life too difficult for Micro-Sherlock, so we again have to adopt a standard. Micro-Sherlock recognises two forms of question – a statement followed by ? or the keyword TEST followed by an expression. So, if you have entered the fact 'You like spinach' we can ask the corresponding question either in the form 'You like spinach?' or 'TEST You like spinach.'

It would be more pleasant to be able to ask the question in the form 'Do you like spinach?' But if you allow this, then there are several various other forms of question that are varieties of the same thing. Allowing for all the variations would be far too complex.

So, to get the show on the road, type in listing 1, run the program and enter the following lines of text, pressing Return after each:

I am hungry

TEST I am hungry

I am hungry?

If all is well, the phrase 'Statement is TRUE' will be displayed after the question – the foundations of artificial intelligence have been laid.

What's in a brain?

Let's take a look at how the 'mind' of Micro-Sherlock works.

Commands are received at line 120. Line 130 checks to see if a star command has been entered, and if so, it performs the command. This is primarily so that predefined lists of facts may be spooled to your tape or disc from a wordprocessor, and then read in using *EXEC. Make sure that you type one fact per line, and don't put in any unnecessary embedded commands or rulers. If the wordprocessor can spool the text as an ASCII file – as *Wordwise* or *Interword* can – then do so. After you've saved the text, type *EXEC ‹filename› from within Micro-Sherlock to read the definitions in.



If your command did not begin with '*', then it is analysed by PROCanalyse. This procedure breaks your command down into constituent words and stores them in the array named words$. The variable numw% is set to the number of words entered.

Once broken down, the first word entered – word$(0) – is checked against a list of keywords that are stored in the data statements at the end of the program. If a keyword matches, the appropriate function is called, using the Basic EVAL function, and a string containing the function name. This is all dealt with at line 200. A list of valid keywords is given in table 1.

If no keyword was entered, Micro-Sherlock checks to see if your command was terminated with a '?'. PROC analyse treats non-alphabetic characters such as '?' as separate words and so if word$ (numw%–1)="?" the command entered was a question. If this is the case, then FNquery is called to evaluate the answer: we shall be looking at FNquery in more detail later.

If all the above tests prove negative, it can be assumed that what you entered was a fact to be stored, and so your command is passed on to FNeval for further investigation. FNeval takes two parameters. The first is the number of the first word of the fact, so if you typed 'I like spinach' this value will be zero; whereas if you typed 'FALSE I like spinach,' the keyword FALSE has to be skipped over and so the first parameter passed to FNeval will have the value one. FNeval tries to spot the two basic forms of expression already described. If you typed three words, for example ‹noun› ‹verb› ‹noun›, then a true fact is added to the store at your disposal. If you typed four, ‹noun› ‹verb› not ‹noun›, then a false fact is added.

In either case, FNfactnum is used to add the fact to the current list, and the function returns the reference number allocated to the new fact. Of course, the fact may already have been entered, so FNfactnum checks it against all existing entries in its list. If a match is found, the number of that match is returned. If not, FNaddfact is called to add the new fact onto the end of the list.

To make life easier, all facts are reduced to a single number. You will recall that all words are allocated a reference number. Thus a fact may be expressed as three numbers. Because each of these numbers is in the range 0-199 (Micro-Sherlock cannot cope with more than 200 words) we can combine these three values into a single unique number (stored in the array called fact%). This conversion is performed by

FNcalcfactno which takes as its parameters the positions of three words in your command. Normally the three words will be consecutive, but if you have included a not in your fact, this must be extracted before storage takes place.

FNfactnum takes two parameters. The first is the value produced by FNcalcfactno; the second is the fact 'type'. Each fact has its own type, and this is stored in the array called type%. The type of a fact is really made up of four 'flags' – each stored as one bit in type%. The meanings of these flag bits are summarised in table 2.

So, as an example, consider what happens when the phrase 'water is wet' is entered.

- The three words are separated and stored in word$(0), word$(1) and word$(2)
- numw% is set to 3
- Each word is allocated a number
- The three word numbers are combined to form a fact number
- The fact number is stored in the array fact%
- The type of the fact is set to 1 (true) and stored in the array type%

The keyword LIST will detail all known words and facts. LIST WORDS will produce something like:

Words: water is wet

and LIST FACTS will display:

False
None
True
water is wet
False, supposed
None

and so on.

The command LIST when entered by itself lists both words and facts. Note that all words are changed to lower case. This is done by PROCanalyse and removes the need for complex case conversion elsewhere in the program.

As with all keywords, LIST has a corresponding function of the same name – FNlist – which calls PROClistwords and PROClistfacts as appropriate. The function FNfax is used by PROClistfacts to convert a fact number back into its original constituent words.

Asking questions

We have already seen the two ways in which questions may be asked of Micro-Sherlock. When evaluating the answer, three special numbers are used: 0 (indicating 'false'), -1 (indicating 'true') and 1 (indicating don't know). Before a question is evaluated, PROCcleartruths is called and this procedure sets up the array called

Keyword	Function
HELP	Lists valid keywords
LIST WORDS	Lists all words defined
LIST FACTS	Lists all facts defined
‹x› ‹y› ‹z›	Define ‹x› ‹y› ‹z› as true
‹x› ‹y› not ‹z›	Define ‹x› ‹y› ‹z› as false
TRUE ‹x› ‹y› ‹z›	Define ‹x› ‹y› ‹z› as true
FALSE ‹x› ‹y› ‹z›	Define ‹x› ‹y› ‹z› as false
IF ‹a› ‹b› ‹c› THEN ‹x› ‹y› ‹z›	Define conditional statement
SUPPOSE ‹x› ‹y› ‹z›	Suppose fact to be true
SUPPOSE ‹x› ‹y› NOT ‹z›	Suppose fact to be false
‹x› ‹y› ‹z›?	Test fact
TEST ‹x› ‹y› ‹z›	Test fact
FORGET	Clear definitions from memory

‹x›, ‹y› and ‹z› represent typical English words

Table 1. Micro-Sherlock keywords

Bit	Meaning if set/clear
0	True/false
1	Supposed/not supposed
2	Dependent/not dependent
3	Condition/not a condition

Table 2. Fact type bits

‹expression A› AND ‹expression B›

Expression A	Expression B	Result
True	True	True
True	False	False
True	Don't know	Don't know
False	True	False
False	False	False
False	Don't know	False
Don't know	True	Don't know
Don't know	False	False
Don't know	Don't know	Don't know

Table 3. AND possibilities

‹expression A› OR ‹expression B›

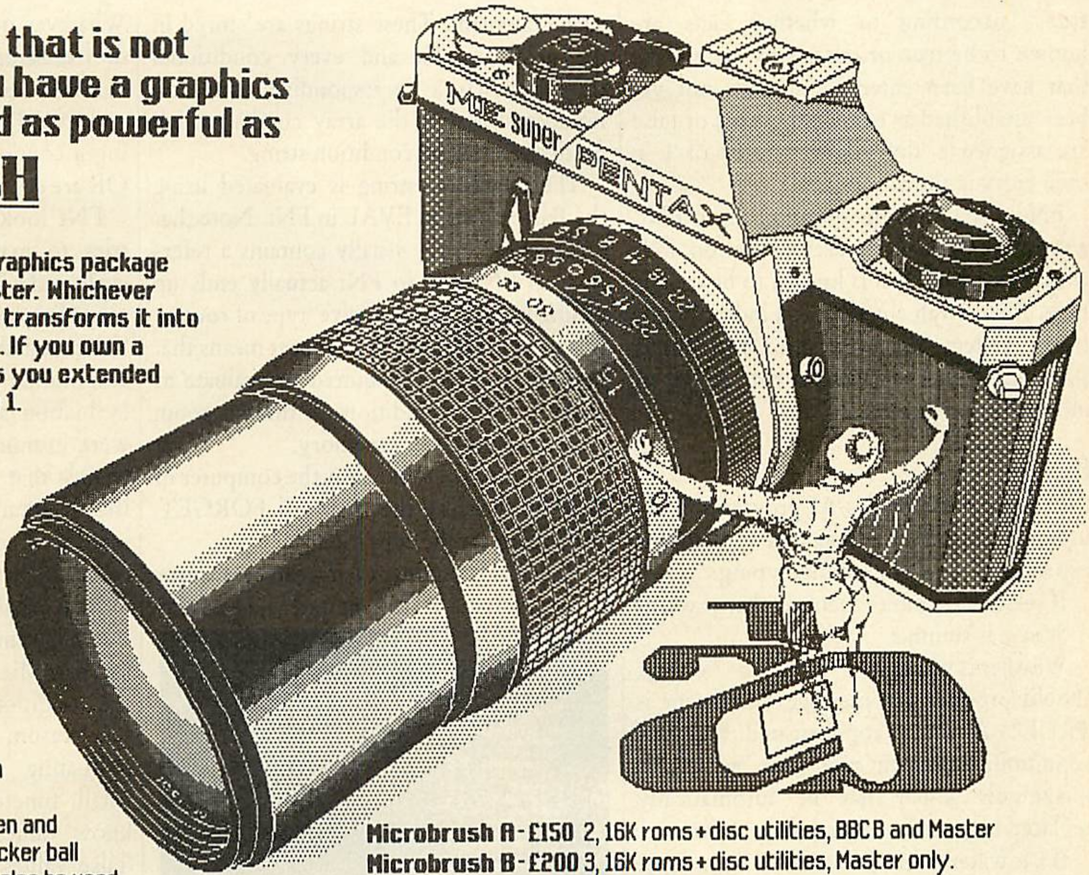
Expression A	Expression B	Result
True	True	True
True	False	True
True	Don't know	True
False	True	True
False	False	False
False	Don't know	Don't know
Don't know	True	True
Don't know	False	Don't know
Don't know	Don't know	Don't know

Table 4. OR possibilities

Could you produce this advertisement on your Micro?

There is very little that is not possible when you have a graphics system as fast and as powerful as

MICROBRUSH



Microbrush is a professional graphics package for either the BBC B or the Master. Whichever machine you have, Microbrush transforms it into a powerful graphics computer. If you own a Master then Microbrush offers you extended resolution in mode 0 and mode 1.

Mode 0 - 1216*416

Mode 1 - 608*416

This whole A4 page was composed as one mode 0 high resolution image using the out-board scroll system, and has a resolution of 1216*900 pixels.

Microbrush for the BBC B is comprised of two 16K roms. The Master version contains a third rom. The first two roms can be used in either machine.

The whole system is menu driven and controlled by the Marconi RB2 tracker ball for speed and precision, but may also be used with either the AMX or the Whigmore mouse. Please note that the tracker ball is not included.

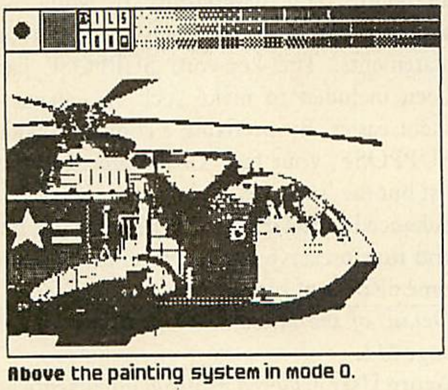
Microbrush A - £150 2, 16K roms + disc utilities, BBC B and Master

Microbrush B - £200 3, 16K roms + disc utilities, Master only.

When ordering please remember to state which system you require, whether you need 40 or 80 track discs and a telephone no. if you have one. Orders and information requests should be sent to-AB Designs, 81 Sutton Common Road, Sutton, Surrey. Phone 01 644 6643

The Colour System

This is just 1 of 33 major graphic systems contained within Microbrush and offers you 42 colours in mode 1 and 42 grey tones in mode 0. New colour palettes can be created with which you can draw lines, sketch, fill, paint in foreground, background, opaque, transparent and combined colour. Add this to a colour rubber which will selectively erase any actual colour and you have a very powerful painting system with more than **1,000,000** possible colours.



Above the painting system in mode 0.

The Ikon Generator

The ikon generator is the main workhorse of the Microbrush system as it is used for both generating and positioning any ikon up to 6*3 character blocks. This system is also used by the typesetter and for creating colour palettes, rubbers, paint-brushes and typefaces. Up to 46 ikons can be stored in memory. The scope of the ikon facility is immense as it allows you to transform the Microbrush system into a purpose built design tool that suits your needs.

The Type Setter

With the Microbrush system you will receive 50 proportionally spaced typefaces. The smallest allows you up to 170 characters to the line and if this is not enough then you can design your own typefaces.

The typesetter displays the current font as a scrollable menu allowing you to quickly produce professional typography.

The Screen Editor and the Special Effects Generator

The screen editor is a powerful drag system that allows you to store up to a quarter of the screen in memory. Once stored, images can literally be dragged across the screen, repeated, copied, saved to disc or fed to the special effects generator.

The Special Effects Generator

This is a very versatile system which will automatically outline, inline, shadow, 3^D, half-tone, etc. any image held within the screen editor's memory.

The Injector rom

The Injector rom is the second rom in the Microbrush system. This rom contains the drawing functions such as lines, rectangles, circles, ellipses, arcs, rotate, squash, stretch, zoom, halve and quarter screens, plus a whole host of other functions.

This is a very brief description of just 7 of the 33 graphics systems contained within Microbrush. All of the systems are both fast and easy to access. Microbrush also includes a 7*7 character pixel editor and an Epson FX80 screen dump.

The Master rom

The Master rom takes you into a completely different world of graphics with almost 4 times the resolution in modes 1 and 0, plus 2 on-board graphics screens, 10 rom based typefaces and a 10 point perspective system. This is linked to a 3^D generator which is soon to be released on a 4th rom for complex perspective tasks such as the camera seen above. Also available for the Master rom is an out-board scroll system which allows you to build images with a resolution greater than 1216*2000, plus there are high res. screen dumps for both Epson and Integrex printers.

Lastly flick through the pages of this magazine and see how many of the other graphic systems are capable of producing their own advertising.

Extentions to the Microbrush system include - The out-board scroll system-£40, an extended Master rom offering you 14 colours in mode 1 and 4 colours in mode 0 - £85, a typeface editor plus fifteen extra typefaces - £25, the Master rom when purchased separately - £65.

true% according to whether facts are known to be true or false. Any statements that have been entered but have not yet been established as being either true or false are assigned a 'don't know' value of 1 in their entry in the array true%.

FNquery passes the question on to FNt, a short but particularly useful function. FNt checks to see if a fact is known to be true or false. If so, a value is returned indicating its truth. Often, however, the truth of a statement depends upon the truth of one or more other statements.

If...

Of course, what makes AI programs really useful is the ability to evaluate conditional expressions. So, for example, typing:

If season is summer then weather is warm
Season is summer
Weather is warm?

should produce the message 'Statement is TRUE'. A more sophisticated form of conditional statement might use 'wildcards' – symbols which may be automatically replaced by specific examples, for instance:

If x is water then x is wet

Micro-Sherlock supports the former 'specific' type of conditional statement, but it is left as an exercise for interested readers to add the 'general' type.

The keyword IF is used to identify conditional statements and, as expected, function FNif is called. After decoding an if expression, both the conditional fact and the facts upon which it depends are added to the list. The conditional fact is allocated a type of 5; 1 because it's true plus 4 because it depends on something else. The conditions are allocated type 9; 1 because they need to be true if the condition is to be satisfied plus 8 because they are conditions. Note that to avoid confusion, the conditions are not listed on the screen as separate categories by FNlist.

The keyword THEN is expected as the means of separating the conditional statement from its conditions. The keywords AND and OR are also recognised, and are interpreted by FNcond as extensions to the basic conditional form. So, for example:

If season is summer or sky is sunny then weather is warm

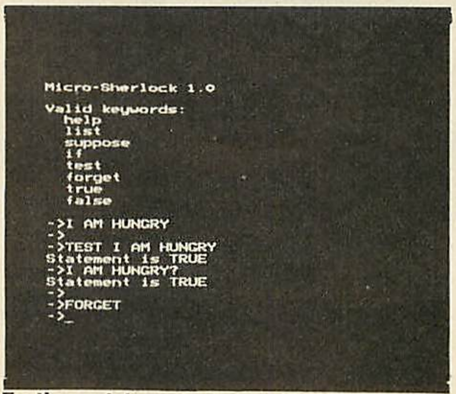
will be interpreted correctly. The single conditional statement 'Weather is warm' will be added to the list and the conditions 'season is summer' and 'sky is sunny' will also be added but will be given a different type value. To establish whether the conditions of a conditional statement are met or not, a condition string is defined for each such statement. These strings are stored in the array cond$, and every conditional statement has a corresponding condition number stored in the array cond% which points to its actual condition string.

The condition string is evaluated using the Basic function EVAL in FNt. Note that a condition string usually contains a reference to FNt and so FNt actually ends up calling itself. This 'recursive' type of routine is typical of AI programs since it means that just one routine is required to evaluate as many levels of conditions as there is room for in the computer's memory.

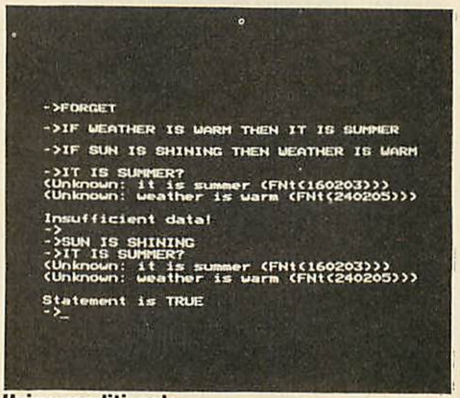
For example, if you clear the computer of facts by entering the keyword FORGET, and then enter the condition:

If season is summer then weather is warm

the conditional statement and its condition



Testing a statement



Using conditionals

are added to the list. If you now enter LIST FACTS you will see under True, dependent a statement like:

weather is warm (FNt(40302))

The phrase 'weather is warm' is true if the value of FNt(40302) is true. The number 40302 is the fact number of the condition 'season is summer'. By including it in a call to FNt, the program can use Basic's EVAL function to do all the work for us: EVAL FNt(40302) will return a true value (-1) if season is summer, a false value (0) if season is not summer and a don't know value (1) if insufficient information could be found. Whatever questions are asked, either -1, 0 or 1 is returned, and this makes it easy to combine results using the keywords AND and OR. The possible outcomes of evaluating a condition string containing AND or OR are detailed in tables 3 and 4.

FNt looks through its list of facts and tries to match each with the one being evaluated. This search is performed in ascending type value order so that 'true' and 'false' statements are searched for first and conditional statements last. This order of evaluation is vital – if conditional statements were examined first then there is a good chance that infinite recursion would make the program run out of memory. In general, intelligent programs should look at the certainties first and the possibilities last.

Note that if you define a conditional statement and then prove the condition to be false, Micro-Sherlock cannot deduce that the conditional statement is itself false. For this reason, FNonlytrue is invoked when evaluating conditional statements. This small function passes 'true' and 'don't know' values straight through, but converts 'false' values into 'don't know's.'

As it stands, Micro-Sherlock offers an introduction to simple expert systems. It can answer questions where it is provided with enough facts to do so, or tell you if it can't . But there are several useful additions to Micro-Sherlock that can be made. Limited space means that these must remain only suggestions, but you could try and add wildcard conditions or specific FORGET.

A special word number (for example, zero) could be allocated to a 'wildcard' character 'X'. FNt could be altered so that 'X' matches all words.

The keyword FORGET currently forgets all words and definitions. It could be extended to apply to just one class of statements. The keyword SUPPOSE has been included to make such an enhancement easier. By prefixing a command with SUPPOSE, your fact is still entered in the list but the 'suppose' bit in its type is set. An enhanced FORGET could check for this bit and thus preserve real facts but at the same time dispose of suppositions.

Details of the Micro-Sherlock listing are on page 111.

Acorn User *explored artificial intelligence in detail in March 1987. The programs from that issue included* Lear, *a computer-generated poetry program,* Eliza, *which attempts to simulate natural conversation and* Gus, *a problem solving listing. The March 1987 magazine and disc are still available; for details see page 134.*

BLOWING HOT AND COLD



How much heat does your house lose at night? Wire a thermometer to your micro to find out

Joe Telford

Last winter, I planned to defeat the dreaded 'Cleverland Chill', the biting wind that blows through this northern outpost of humanity. My first thought was to consider adding double glazing and loft insulation to Telford Towers. But the major banks jibbed at funding these additions, and especially at the cost of refurbishing the ramparts and turrets. So I decided I had to look for the cause of the cold. Why weren't the huge log fires keeping the place warm in the first place?

There are a number of ways of measuring temperature electronically. Of the available options, I chose an integrated FE33L temperature module. This comes complete with a liquid crystal display that can show the temperature directly, but it also has a built-in serial link to connect it to a micro. The whole thing is available at a reasonable price by mail order from the Maplin catalogue.

Its specification covers a range of −20C to +70C, with an accuracy of better than 1C over most of the range. Its resolution is 0.1C and it's powered by 1.5V push-in pen-cell battery.

The diagram in figure 2 shows the connections for the sensor. The pins along the top of the unit are only necessary if you wish to extend the use of the unit. Pins 2, 3, 4, 5, 11, 12, 13 and 14 can be connected to pin 16, the positive supply, via switches and the various functions set. The other pins are outputs, apart from the ground (pin 1), and these have to be buffered before they will function. A comprehensive leaflet comes with the module and it really is a doddle to use.

ILLUSTRATION BY ANT PARKER

Enter the BBC micro

I thought that I would use the BBC micro to examine the temperature during the day, and the ability of the temperature module to transmit the temperature via a serial link every few seconds is ideal. But the serial output is not quite up to the RS423 standard, so a simple interface needs to be built. Because I wanted to plot the temperature each minute during the day, I decided to leave pin 5 unconnected so the temperature is read every 10 seconds. If you want to measure temperature every second, for example in scientific experiments, you'll need to wire a link between pins 5 and 16. Fitting a switch would give you the option.

The serial link

Pin 10, which is a clocking line, generates 13 pulses every time the temperature is transmitted. These pulses only last in total for 18 milliseconds, too fast to read in Basic. As each clock pulse appears, line 9 (the data line) transmits a 0 or a 1. Figure 3 shows a typical example where the serial data line transmits a pattern of 1s and 0s to the steady pulse of the data clock. The 13 possible bits of data on the data line are decoded as shown in the table on page 93.

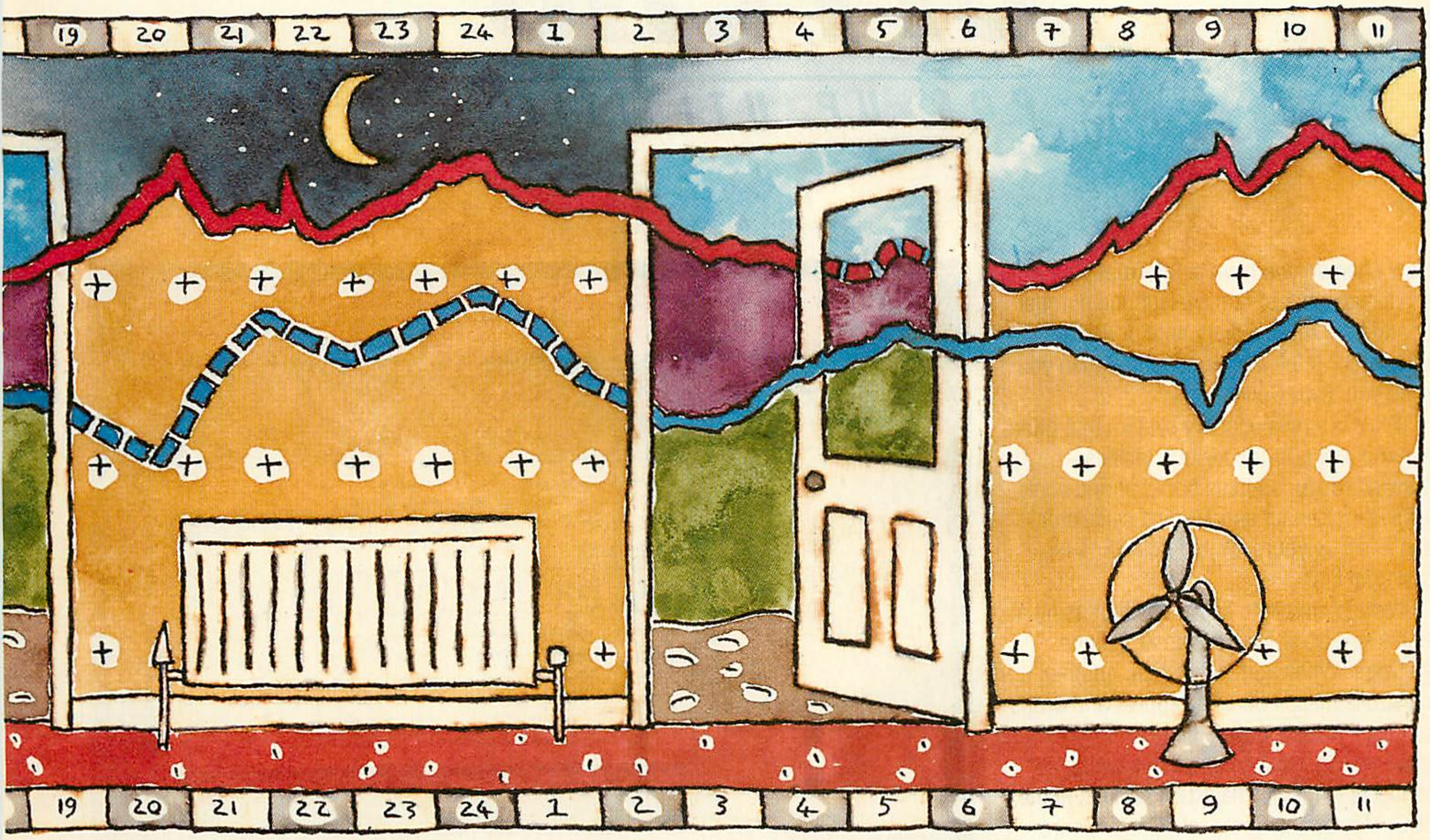
Making the link work

There are lots of different ways to connect any peripheral device to the BBC micro. The approach I chose was the user port, although you can't connect it directly. It's something (said the leaflet) to do with impedance matching. Figure 4 shows a small interface board, and it is so simple that it can be wired on PCB or piece of Stripboard, and connected directly to the temperature module on one side and to the user port via a parallel lead and connector on the other.

The complete circuit uses very cheap components; a couple of BC108 transistors and 100k resistors. These protect the temperature module from the BBC's 5 Volt supply. An optional link was designed in because I felt that access to the user port interrupt line might be useful. You should expect to pay about five pounds for all the components for an interface, including the connecting cable.

The user port inputs are all held high via resistors in the BBC micro and so in the circuit which I've developed, these internal resistors act as collector resistors for the interfaced transistors.

There is one disadvantage to using such a simple interface – at the BBC micro end of the interface, the serial lines are inverted.



The serial lines are usually high, but pulse-low when data is sent, and the software has to be written with this in mind.

Simple software

The first program I tried once the system was hooked up was:

REPEAT : P. &FE60 : UNTIL FALSE

I wasn't particularly surprised to find that nothing happened. No little pulses or numbers changing, just the steady 255 of the empty user port.

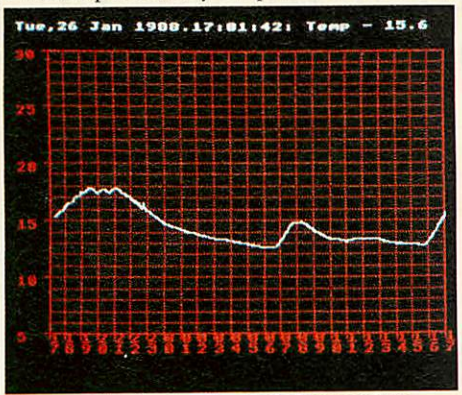


Figure 1. Monitoring the day's temperature

Listing 1 on the yellow pages does read the user port fast enough. The machine code in the listing is only used in this program for speed of action to catch the pulse which only last 18 milliseconds. The assembly language is quite compact, and handles the task of reading 13 data pulses into a buffer then returning to Basic. The FNreadtemp function is the part which converts the received serial data to a temperature value. In fact, this function works in the same way that we would decode any binary-coded decimal (BCD) data, in groups of four bits at a time.

Look at the DEFPROCassemble section of listing 1. It functions as follows:

- The buffer pointer is set to 0
- Now go to a routine to wait for the first clockpulse (JSR waitforpulse)
- When the pulse is detected, test for a data line pulse and convert this to a 1 or 0 and store in the buffer
- Loop from 1 to 12
- Wait for next clock pulse (.waitforpulse)
- Decode data line signal (.separate)
- Return to Basic

We use SEI and CLI to prevent any machine interrupts, because the task of reading the data takes 18 milliseconds. Note, however, that SEI is only used once the first pulse has been detected – otherwise interrupts would be disabled for almost all of the time.

Plotting the temperature

We can now make use of this simple routine to measure the temperature near the BBC micro. Listing 2 in the yellow pages does this. Connect the temperature sensor module and run the program. For a first attempt, enter 10 as the lowest temperature, and 30 as the highest. Press Return to the 'Graph lines every how many degrees?' question – this sets a default of one-degree intervals. Now set the record time in hours to 2 and answer the 'Graph lines every how many minutes?' question with 5 – using Return by itself here would set a default of 60. The program the asks for the time; use the 24-hour clock, so 12 minutes past one o'clock is 13 hours, followed by 12 minutes.

The screen clears and a red graph page appears, one axis marked in degrees and the other in hours and minutes. Leave the micro alone and when you return, a white line should be growing across the screen, slowly lengthening every few minutes. Its rises and falls follow the temperature recorded on the temperature module, at minute intervals. Look at figure 1 – a record of a day's temperature at Telford Towers.

The program allows four key presses to be accepted. The P, S, R and X keys are acted upon at the end of a temperature-sensing cycle, although because interrupts are disabled part of the time, you may have to hold them down a bit. I tend to hold down the Caps Lock key while I tap the keys, so that when the Caps Lock light changes state, I can tell my key press has been accepted. The 'X' key exits back to Basic, and the 'R' key reruns the program. The 'P' key prints the graph as a screen dump to an Epson printer, and the 'S' key saves the screen to disc. I've used *SAVE TEMPFILE FFFF3000 +500, but you

OFFERS

POP UP UTILITIES

How often do you have to interrupt your on-screen work to find a telephone number or address, make a diary note or use a calculator? If the answer is 'often' then you need your own *Genie*.

Genie is a revolutionary system that offers a number of pop-up desktop utilities – notepad, diary, address book, phone book, 100-year calendar and 10-digit calculator, and it can be yours for just £69.35, a big saving of £10.

Genie is simple to call into action using a single keystroke from within all serious software. When you've finished, another keystroke makes *Genie* disappear and drops you back were you were before.

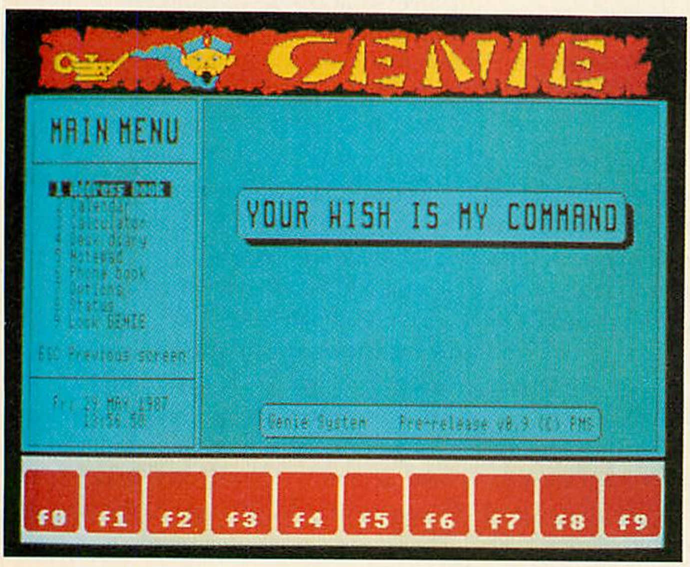
Genie consists of a small box which connects to the normal ROM sockets of the BBC, Master and Compact. Master users can use the package in the EPROM cartridge version. With its battery back up there is no need to save your work when *Genie* is called up, it's stored automatically.

Genie Junior has exactly the same desktop utilities as its battery-backed brother but *Junior* stores all its data on a disc, and costs £20 .

Genie is just £69.35 (saving £10) and *Genie Junior* can be yours for only £20. '*Genie* is a superb package. . . I couldn't be without it.' *Acorn User*, August 1987.



Great utilities at a touch of a button – and save £10!



Please send me:

__________ copies of *Genie* in a Box at £69.35

__________ copies of *Genie* Master Cartridge at £69.35

__________ copies of *Genie Junior* at £20

UK orders add £2 P&P, Overseas orders deduct 15% VAT and add £4

Please circle as appropriate: BBC B/BBC B+/Master 128/Compact/Electron DFS/ADFS 80T/40T 5.25-inch/3.5-inch

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ADDRESS__________

__________POSTCODE__________

I enclose my cheque/postal order for £__________made payable to **PERMANENT MEMORY SYSTEMS**

Please charge my Access/Barclaycard

ACC/NO □□□□ □□□□ □□□□ □□□□ EXPIRY DATE □□□□

Please send this coupon with remittance to ***Genie* Offer, *Acorn User* Merchandising, Redwood Publishing Ltd, 20-26 Brunswick Place, London N1 6DJ**

For more *Acorn User* offers see page 129

could save some disc space by using my *PACK command from last month's *Acorn User*. Remember not to save two graphs straight after each other, because the save routine only uses one filename – TEMFILE – and the first would be overwritten.

The second sensor

The Maplin package includes a second sensor, which has to be connected before it works properly. This is quite a task and, although the leaflet recommends a simple switch, to allow the computer to select between the internal and external sensor it really needs a relay.

Figure 5 is the underside of the temperature module once the battery compartment is removed. To do this first remove the battery, then carefully unscrew the six tiny screws on the front of the module. The white battery cover comes away, and you're left with a green PCB with a black spot. At the bottom centre of the module is an orange bead thermistor, the temperature sensor itself. One lead runs close to a silver canned device – which is probably the clock crystal – and this lead should be carefully unsoldered.

Now look at figure 6. You have to solder three wires to the sensor area. Make them long, and then they can be cut shorter if need be. The sensor can be gently glued back in place, with its leads not touching. Now, to use the built-in sensor, you just connect leads T1 and T2. To use an extra sensor, you wire it between T0 and T2. This can be done manually, but Maplin also provides a small single-pole double-throw (SPDT) relay, model FM91Y, which will do the job. It runs from the BBC micro user port's 5 Volt line.

Building a two-sensor interface

The circuit diagram in figure 7 shows the extra components necessary for switching in either the internal sensor or the external sensor. A PCB design is available for this circuit, by sending an SAE to the editorial address on page 3, or a file for use with my PCB design program (December 1987) is on the monthly listings disc. A ZTX300 and a user port line 0 are used to switch the relay, which is powered from the 5V line available on the user port.

The only critical point is making sure that the T0, T1 and T2 leads are connected correctly to the relay. I used PCB screw terminals to connect these wires, and checked that before connecting to the BBC micro, the internal temperature sensor was reading a value. Next, I connected the

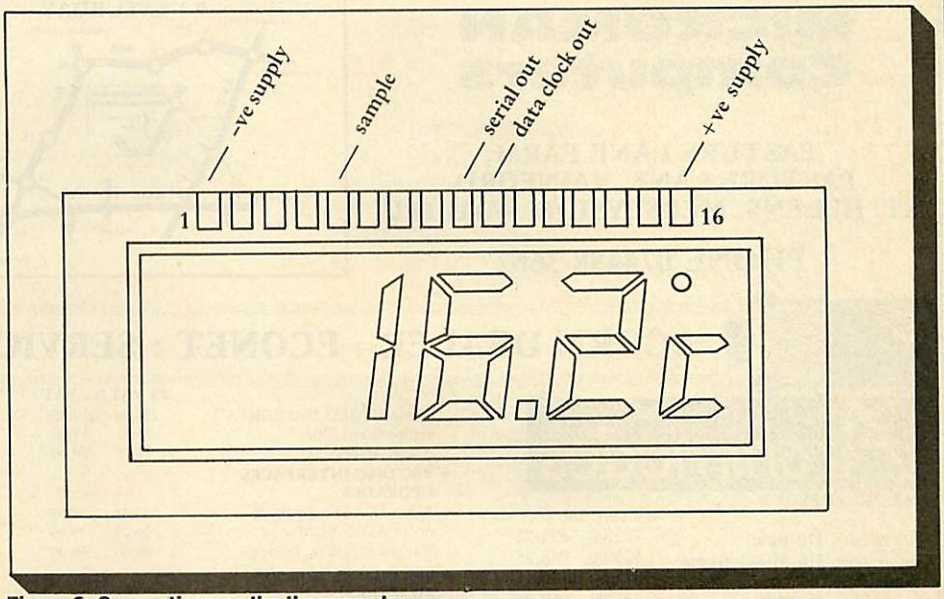


Figure 2. Connections on the thermometer

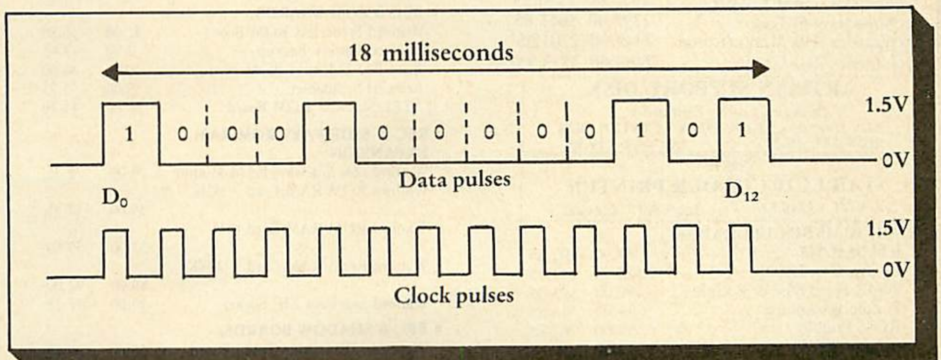


Figure 3. A temperature signal

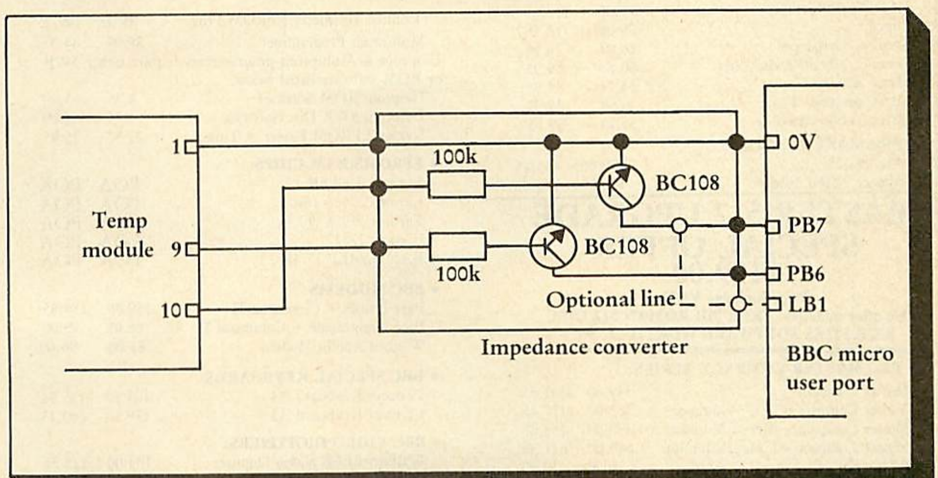


Figure 4. Interface circuit

external temperature sensor (between relay and module), and placed the external sensor in a warm place, so it would read a much higher value than the internal sensor.

Once the interface is connected, a couple of lines of Basic can be used to switch between the two sensors:

```
?&FE62=1
```

sets up user port line 1 as an output then

```
?&FE60=1
```

selects the external sensor and

```
?&FE60=0
```

selects the internal sensor.

The total cost of the complete interface should be about £7.

Twin temperature graphing

Listing 3 on the yellow pages is an extension of listing 2 to graph both sensors at the same time and it is set up just like the single temperature graphing program. We must, of course, remember that the external sen-

sor may be in an environment with a higher maximum or lower minimum temperature, and the temperature range must be entered as appropriate to the full range which might be experienced. Figure 8 is a typical print-out from this program.

Now I had the technology to monitor heat loss night and day, so I logged the changing temperatures, week by week, for each room in Telford Towers.

It would be best for most programmers if the temperature were always available by calling up a variable. For example you could PRINT T% and the temperature should appear, with no complex calls to the machine code or long waits while the 10 second temperature cycle elapsed.

Listing 4 is the program to make this happen. It makes use of the extra link to the CBI pin of the user port. The software changes the user vector at ?&206 to point to the main body of the code, sets up the user port interrupt registers to recognise a CBI interrupt and exits. Then when the interrupt strikes it disables the interrupts and sets aside four bytes for the data. It then sets the first byte to represent the minus or plus state of the temperature, and set bytes 2, 3 and 4 to the 10s, units and tenths of degrees. After converting these four bytes into BBC micro integer format, and transfering that integer to the memory location occupied by T%, it re-enables the interrupts and exits along the old interrupt vector.

Type in listing 4, then save it to disc. Run it and it will save a machine code program on disc, which can be run using the command *TCP. This loads the main code into pages &900 and &A00 of memory, then sets the user vector to point into the main code. As soon as this is done, the temperature module serial data will be read and placed in T% in tenths of degrees centigrade. If T%=254, the temperature is 25.4C. This is no more complex than TIME being measured in hundredths of a second, and the program should work with all versions of the BBC range with a user port, bar the Arc.

Once the code is installed, it will continue to work until disabled with the Break key. But you must not load anything else into the memory allocated to TCP (&900-&AFF), because this will crash it.

By the way, I eventually found out why the Towers was losing heat. Every day just after I'd gone to work, a courtyard door was left open. This showed up as a beautiful trough on the graphs. Pity that no one would own up to it, but spending that tenner has saved me a packet!

Details of Joe's listings are on page 113.

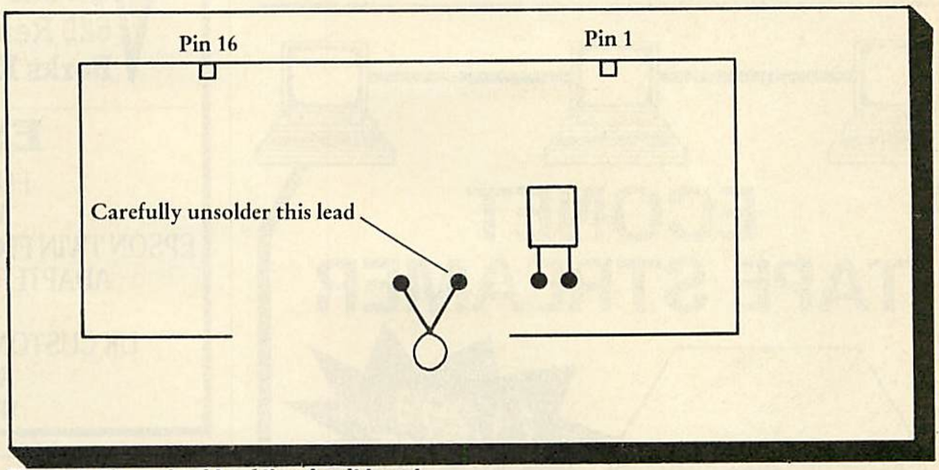


Figure 5. The underside of the circuit board

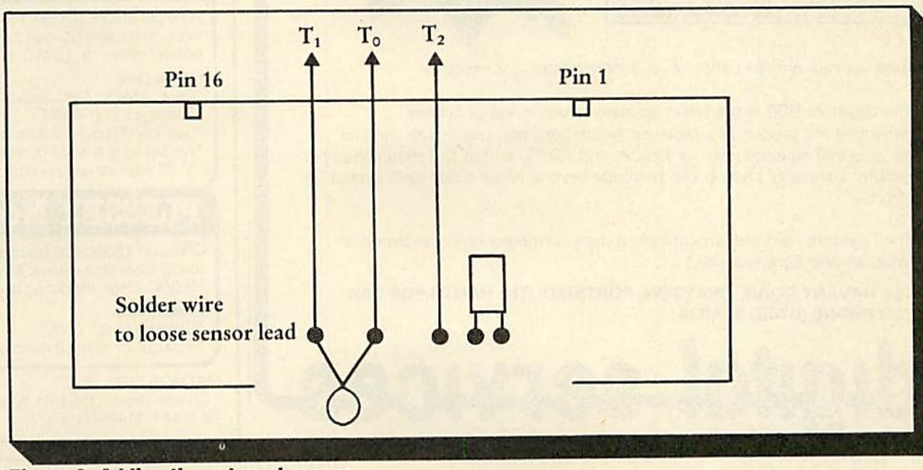


Figure 6. Adding the external sensor

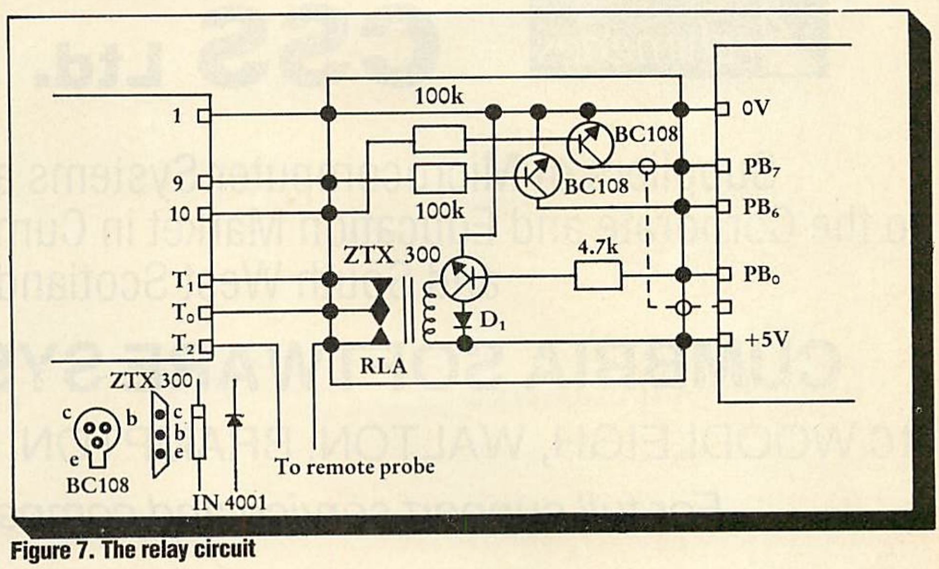


Figure 7. The relay circuit

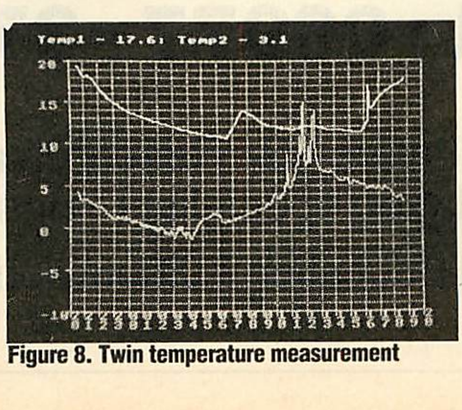


Figure 8. Twin temperature measurement

Bit	Meaning	Range
0	Above or below freezing	0-Above
		1-Below
1-4	Temperature (10s)	0-7
5-8	Temperature (units)	0-9
9-12	Temperature (tenths)	0-9

The bit-coding of the temperatures

TO BOLDLY LOGO

Logo can greatly simplify programming for children. Some simple commands to draw star maps show the way

Peter Julian

Logo is a very versatile programming language. Many teachers are familiar with turtle graphics and the way Logo can be used to teach geometrical and mathematical concepts, but it is still rare to find someone familiar enough with Logo to use it creatively.

In this article we'll look at a simple system for drawing maps of the sky showing constellations and planets. The beauty of using Logo for this kind of work is its simplicity – only four extra commands needed to be added.

Drawing star maps

Before you start, read the 'setting up' section below. To plot a star on the map you use the command STARPOS. The procedure programs the function keys with the new commands, so you can use f1 instead. The STARPOS command should be followed by the X and Y co-ordinates of the star you want to add, for example:

STARPOS 350 400

The co-ordinates can range from 0 to 1275 on the X axis, and 0 to 600 on the Y axis.

Planets can be drawn on the map with PLANET (f2). As well as the X and Y co-ordinates, the sizes of the planet must be specified. The size can vary between 1 and 30, so to draw a planet of size 12 at 750,375 you could type:

PLANET 12 750 375

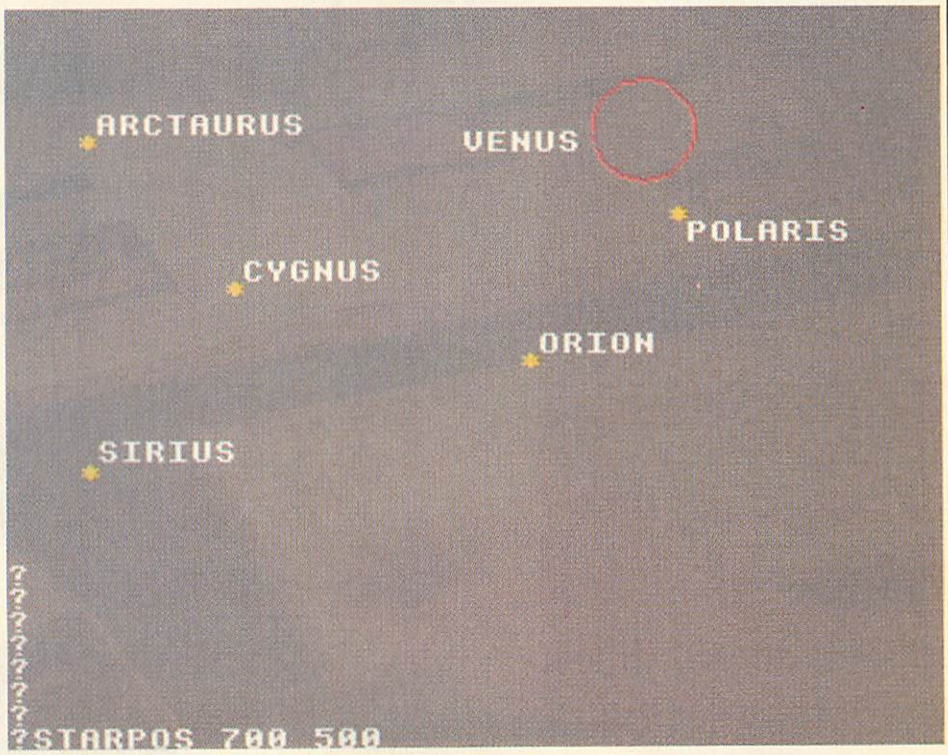
You can add labels to the stars and planets on the map with the LABEL command (f3). The label should be preceded with a double quote (") in the usual Logo style:

LABEL "Sirus 345 560

Take care with the X and Y co-ordinates so you don't print over any stars.

If you make a mistake, or want to change the map, prefixing the command with WIPE (f0) will undo the damage. For instance, to remove the label in the example above you would type:

WIPELABEL "Sirius 345 560



Draw simple constellations with the STARMAP procedures

Setting up

Before the program can be used a certain amount of preparation must be done.

Logo graphics use an origin (0,0) in the centre of the screen. This would make the co-ordinates for the stars very unwealdy to use, so we must set the origin to be at the bottom left-hand corner of the screen. This requires a short machine code routine, which is listed above right (listing 1). Type in the program with the computer set up in Basic, and save it on disc. Run it and a short file will be saved to the disc which will be used by the Logo commands.

```
10 REM GRAPHICS SCREEN TEST ROUTINE
20 P%=&780
30 [
40 LDA #&75
50 JSR &FFF4
60 STX &80
70 RTS
80 ]
90 *SAVE TEST 780 788
```

Listing 1. Sets graphics origin to bottom left

Next, enter Logo with *LOGO and type in the procedures from listing 2. The UPDATE procedure makes editing easier. As Logo will not allow you to overwrite a file, UPDATE deletes the old file before saving the revised version. When you have

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finished save the procedures your onto disc as 'STARMAP'.

If you want to be able to print out copies of the maps on a dot-matrix printer, then copy the uSDUMP program from the Logotron Logo extension disc onto your work disc.

The program normally uses Logo's default mode 4 screen to display the star maps, but will work in mode 1 if you want to use colour. The SETUP procedure checks the current mode and changes the colours used accordingly, however you may have problems with lack of memory if you use mode 1 on an unexpanded model B. Changing modes is rather complicated – Logo gives an error because the amount of available memory changes. To get around this, load the program into the editor, change mode and then put the program back. Do this by typing EDALL to load the program into the editor, then press Escape. Delete it from the main memory with ERALL and change mode with SETMODE 1. Re-enter the editor with ED and replace the program into memory by typing CTRL-C.

To make starting up as easy as possible for the children who will use the program, it is best to set up the disc to boot automatically when Shift-Break is pressed. To do this you must create a !BOOT file by typing:

```
*BUILD !BOOT
```

A number 1 will appear on the screen. Enter the following commands, finishing each with Return:

```
*LOGO
USE "uSDUMP
LOAD "STARMAP
SETUP1
```

Finally press Escape to finish. Now make the disc *EXEC the !BOOT file whenever Shift-Break is pressed by entering:

```
*OPT 4,3
```

The disc is now ready to use for drawing star maps – just type Shift-Break.

In the classroom

As with all programming, preparation is essential. Rough sketches of the map can be made on graph paper, and ideas tried out on the computer. If you type in commands, then be sure to note the co-ordinates as the text will rapidly scroll off the screen. When you have worked out what you want, enter the map as a procedure, as in listing 3.

To save a child's map use the SAVE command and follow the filename with the name of the procedure you want to save enclosed in square brackets, for example:

```
SAVE "JANESMAP [GALAXY]
```

By building up a library of maps you can create a simple 'database' of constellations – perhaps each pupil could take one particular star cluster and draw it out.

Logo can be used like this to greatly simplify programming for children. Setting up well-chosen commands makes controlling the computer clear and easy – there is more to Logo than just turtles!

```
TO SETUP1
*KEY 0 "WIPE"
*KEY 1 "STARPOS "
*KEY 2 "PLANET "
*KEY 3 "LABEL "
*LOAD TEST
SETUP
END

TO STARPOS :X :Y
test SETPC :C2
PU SETPOS SE :X :Y
HT VDU [5]
PR [*] VDU [4]
END

TO PLANET :size :X :Y
test SETPC 1
HT PU SETPOS SE :X :Y PD
IF :size > 30 [MAKE "size 30]
IF :size = 1 [VDU [5] PR [o] VDU [4] STOP]
IF :size = 0 [VDU [5] PR [.] VDU [4] STOP]
REPEAT 72 [FD :size RT 5]
END

TO LABEL :name :X :Y
test SETPC :C3
PU SETPOS SE :X :Y
HT VDU [5]
PR ( :name ) VDU [4]
END

TO SETUP
CS
VDU [29 "0 "345]
VDU [24 "0 "0 "1279 "1023]
CS WINDOW HT
IF ( OR EQUAL? MODE 0 EQUAL? MODE 4 ) [MAKE "C2 1 MAKE "C3 1]
[MAKE "C2 2 MAKE "C3 3]
END

TO test
.CALL 1920
IF ( .EXAMINE 128 ) = 0 [SETUP]
END

TO WIPESTARPOS :X :Y
PU SETPOS SE :X :Y
HT VDU [5]
SETPC 0 PR [*] VDU [4]
SETPC 1
END

TO WIPEPLANET :size :X :Y
HT PU SETPOS SE :X :Y PD SETPC 0
IF :size > 30 [MAKE "size 30]
IF :size = 1 [VDU [5] PR [o] VDU [4] SETPC 1 STOP]
IF :size = 0 [VDU [5] PR [.] VDU [4] SETPC 1 STOP]
REPEAT 72 [FD :size RT 5] SETPC 1
END

TO WIPELABEL :name :X :Y
PU SETPOS SE :X :Y
HT VDU [5]
SETPC 0 PR ( :name ) VDU [4]
SETPC 1
END

TO UPDATE :filename
PR [To update an existing file type Y] *WIPE :filename
SAVE :filename
END


MAKE "C3 3
MAKE "C2 2
MAKE "filename "STARMAP
```

Listing 2 (above). The STARMAP procedure. Listing 3 (below). A procedure to draw a map

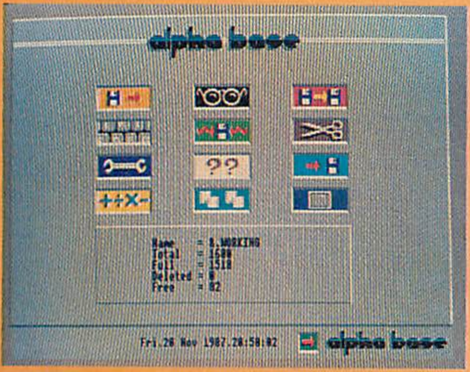
```
TO GALAXY
CS
STARPOS 350 400
LABEL "Stella 400 400
PLANET 10 800 350
LABEL "SUN 825 350
STARPOS 100 250
STARPOS 1200 100
PLANET 1 550 600
LABEL "Planet 600 600
END
```

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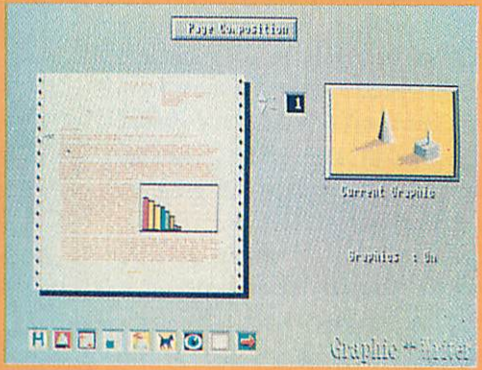
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MICRO USER April 1988

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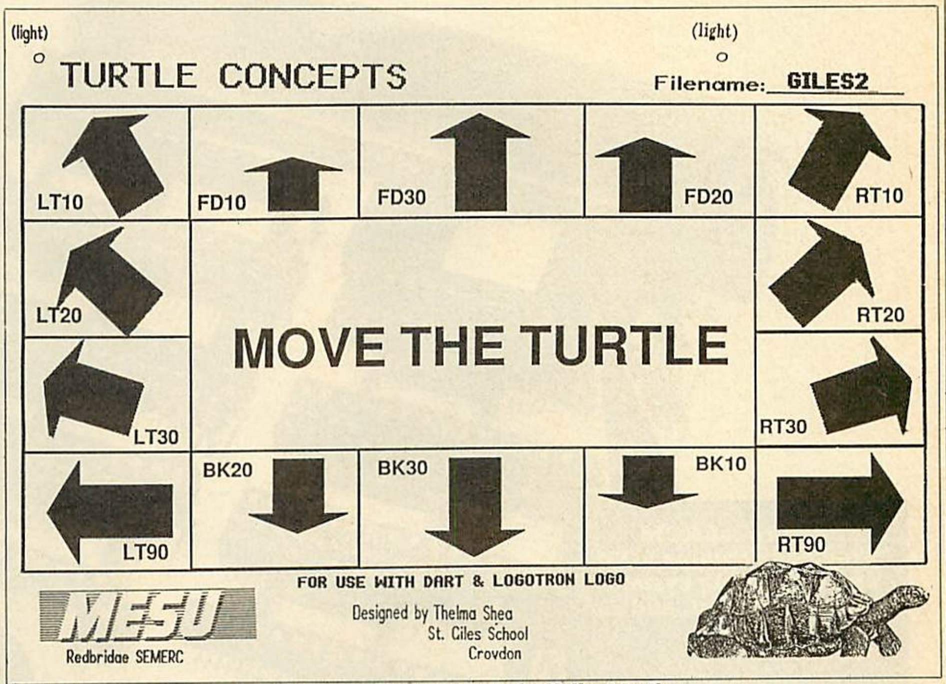
Part two of our review of Concept Keyboard software for children with special needs

Chris Drage and Nick Evans

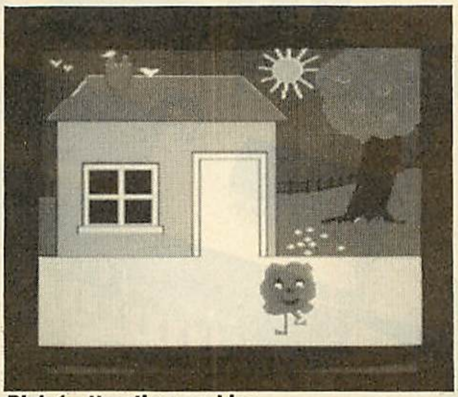
In April we started to look at the Concept Keyboard in special needs education; this month we'll conclude our survey of software for this valuable tool.

The Concept Keyboard scores heavily over other input devices because an overlay can be designed to be attractive and informative, and it can provide an appropriate input medium for any particular application. During the past three years this ingenious input device has become popular in primary, nursery and special needs education. We reviewed it in *Acorn User* in May 1985. Although we are looking at the software from the point of view of teaching children with learning difficulties, the majority of titles are equally useful for children in the early stages of learning.

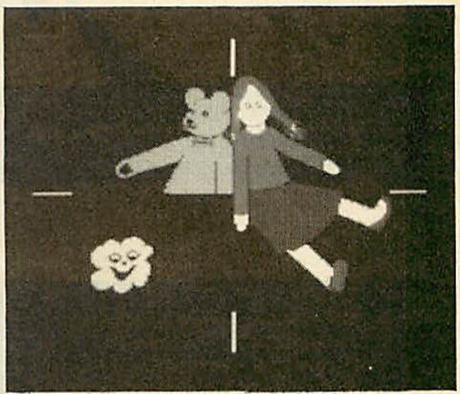
The 'Project Christopher' software simply uses the Concept Keyboard as a switching device. Widgit Software Ltd produces the software for children with physical handicaps or learning difficulties, but a number of the programs are also suited to mainstream nursery and infant school children. Developed in conjunction with the Hospital for Sick Children in London's Great Ormond Street, the software has been written to be used with one of a number of switching devices. However, the Concept Keyboard option can use the whole of the keyboard area as a pressure switch, which can be important. As with all good programs the teacher has a great deal of control over how each program is set up.



***Turtle Concepts*, to be released soon, allows control of a Valiant turtle**



***Blob 1*: attractive graphics**



***Blob 2* : helping visual discrimination**

Centred around the smiling character of 'Blob', the series introduces children to computers and switches. *Where's Blob?* can be used to very good effect with profoundly multi-handicapped children. *Blob1* (seven programs), and *Blob2* (eight programs), provide simple activities which encourage and familarise children with switch operation. Their attractive, clear graphics and animation attract attention, and children enjoy playing with Blob. Skills like directional manipulation, selection and visual discrimination are emphasised. *Going Places* is a suit of 13 games and activities spread over six discs. The programs are based on a day out. The child must decide where to go, what to wear and what to take. The computer simulates the journey, and two games can be played when you reach the destination. Finally, there is the journey home. As each game has three levels of difficulty, there is wide scope for individual child development for three- to six-year-olds. You can discuss and plan choices and decisions with the child. The programs encourage language development and memory skills as well as matching, sequencing, planning, visual memory and counting abilities. Children find the Widgit range great fun as it offers a wide range of interesting activities via the vehicle of the delightful 'Blob'.

Framework programs

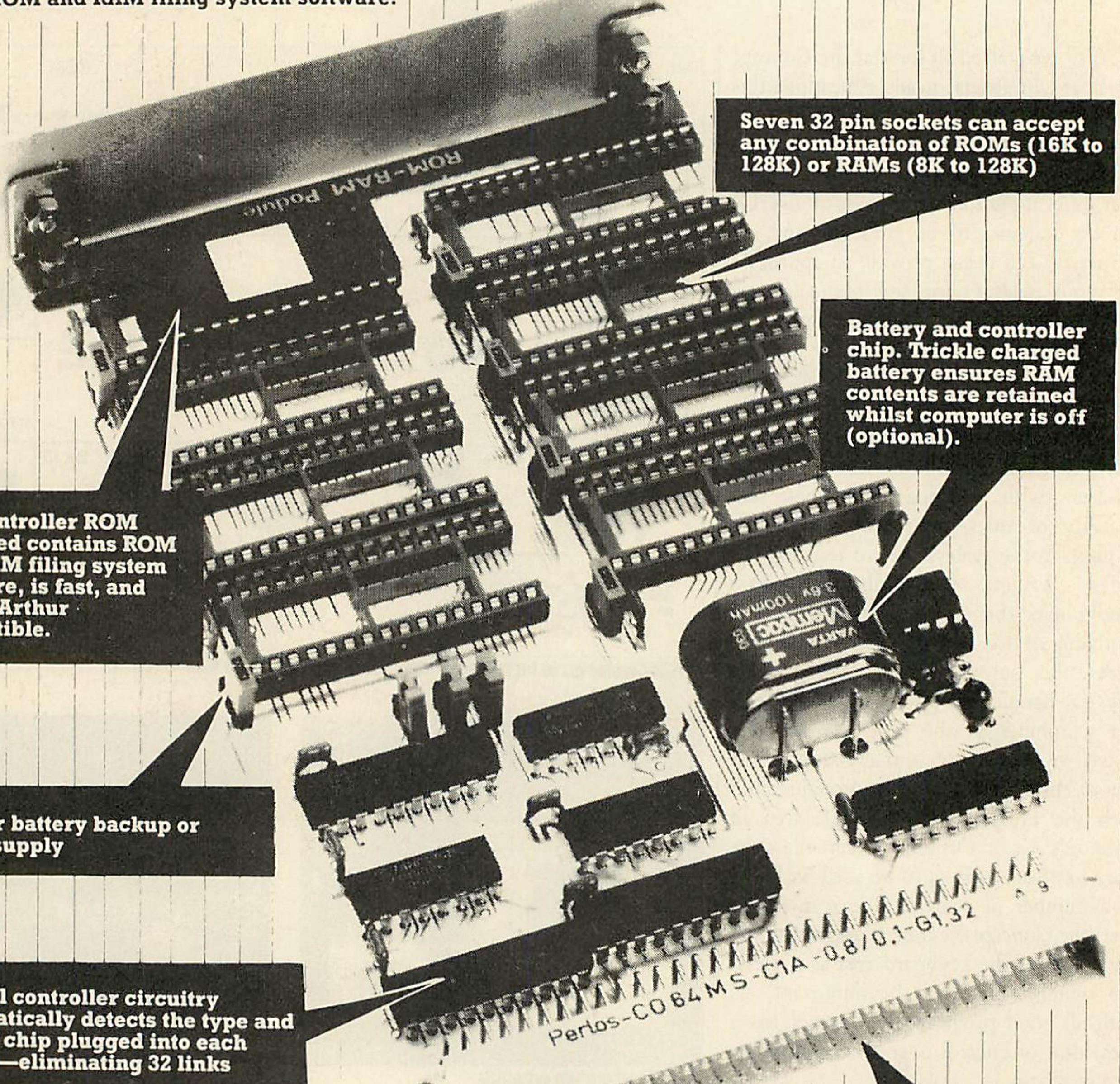
Recently a number of excellent, content-free programs have been developed by the SEMERCs and MESU, many of which utilise the Concept Keyboard imaginatively. They all provide a framework for the teacher's (or pupil's) own files, which are used by the main program to tailor it to meet the individual needs of the child.

A wordprocessor is a typical framework

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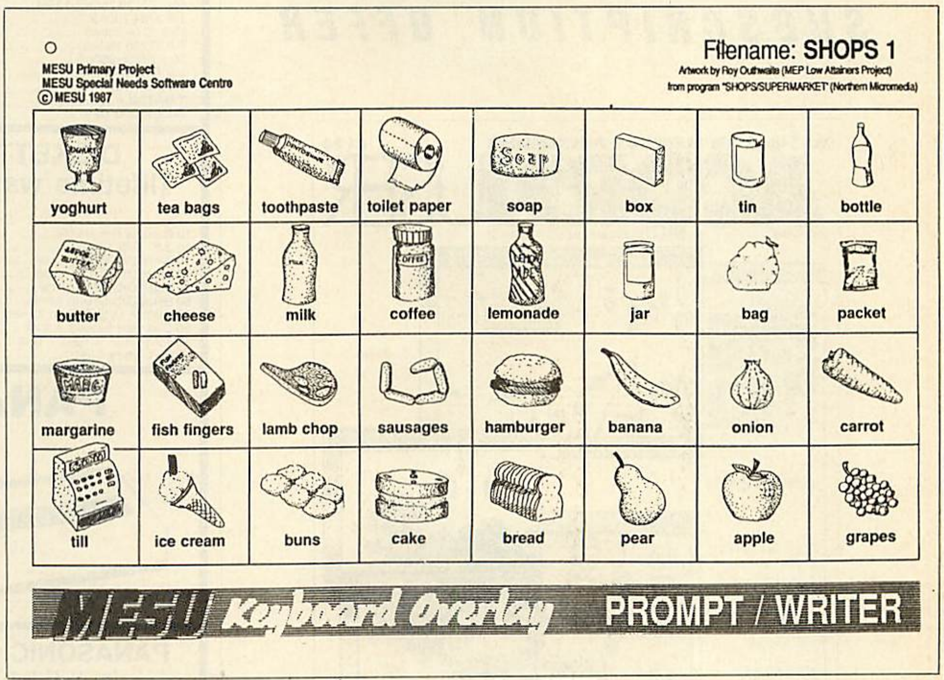
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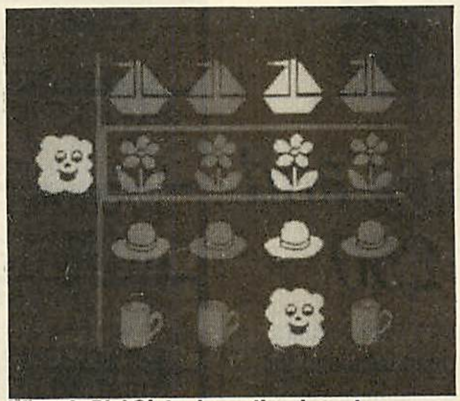
program. *Prompt/Writer*, the latest children's wordprocessor from MESU, is a development of *Prompt3* (a supportive wordprocessor for children with learning difficulties), and *Writer* (a more powerful package) – both are used extensively in primary and special schools. *Prompt/Writer* is an enhancement of both programs, providing a really easy way to make Concept Keyboard overlays and use four sizes of printout. Overlay files may be also used with *Folio* (from Tedimen Software). *Prompt/Writer* allows children to move up from the simpler *Prompt* to *Writer* without having to learn a whole new set of commands. It is also easier to use than either of its predecessors. The 12 sample overlay files provided contain many useful ideas for teachers new to Concept Keyboards. The production of overlays has been simplified considerably. My only grumble with *Prompt/Writer* is that work files cannot be saved on the program disc, which causes a lot of disc swapping for single drive users.

Introducing information handling to children with special needs can be a problem. *List Explorer*, due for release soon, provides a unique and imaginative solution.

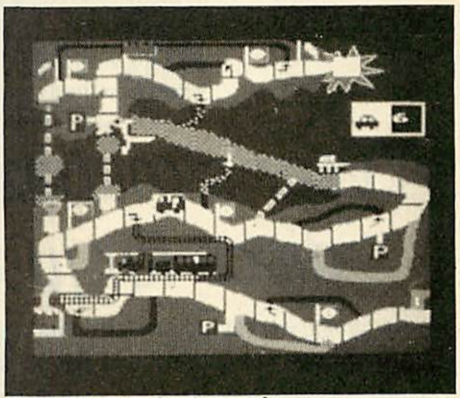
It allows the Concept Keyboard to be used to search and compare data lists. The size of each list is limited to 127 records and headings; for example, 118 objects with nine headings. The number of headings is limited by the number of cells on a Concept Keyboard. Up to seven lists can be stored on a single disc. Given the ability of the children involved, having a large number of records is unimportant. What matters is being able to have cells of a practical size. The six sample overlays and files provided clearly illustrate *List Explorer*'s potential: weather, children, birds, faiths, dinosaurs and an intriguing datafile called 'What's Happening?'. The 'children' overlay comprises 16 photographs of children and 14 fields to search. Touching a photo and any of the headings reveals the data on a particular child. Making new lists and overlays is easy. Sensibly, both regular and irregular overlays are created in a consistent manner for all the MESU Blue File software. This software is an excellent way to tackle database work.



***Prompt/Writer*, the latest children's wordprocessor from MESU**



***Where's Blob?* introduces the character**



***Going Places*: simulates a journey**

Logo concepts

Developed at Redbridge SEMERC, *Turtle Concepts* allows the Concept Keyboard to control a turtle – ideal for children who have trouble with the conventional keyboard. Overlays can be designed to meet individual or group needs, providing a structured introduction to turtle graphics. Procedures written in Dart or Logotron Logo can be linked to particular overlays to explore specific areas of mathematics. The Jessop and Valiant floor turtles can be used, although Logo users may require additional hardware to control the Jessop turtle.

A similar range of overlays is available from Stockport's Dialstone Centre but these support only the Valiant turtle. The 13 overlays are ideal for younger children as they are attractively designed and increase gradually in complexity. Unlike *Turtle Concepts* they are not intended to provide a structured approach to learning Logo, but are a teaching resource.

The software we have discussed represents only a small fraction of the Concept Keyboard resources available, and therefore is only a small indication of the ability of computers to help children with learning difficulties. However, this potential can only be achieved if teachers are provided with the necessary time and resources to develop the wider use of micros.

Blob1, Blob2 *(£13.80 each),* Where's Blob? *(£17.25),* Going Places *(£40.25), are available from Widgit Software Ltd, 1 The Ryde, Hatfield, Herts AL9 5DQ.*

Prompt/Writer *(£3.00),* List Explorer *(price to be announced), from MESU, Unit 6, Sir William Lyons Road, Science Park, University of Warwick, Coventry CV4 7EZ.*

Turtle Concepts *will be available soon from LEA co-ordinators or SEMERCs.*

Logo/Concept Keyboard overlays are available from Dialstone Centre, Lisburne Road, Stockport SK2 7LL.

Software catalogues available from AB European Marketing, Wharfdale Road, Pentwyn, Cardiff, and Bristol SEMERC, Bristol Polytechnic, Redland Hill, Bristol.

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Walter Cobra and the Quest for the Golden Dragon

You are Walter Cobra, a clever but absent-minded young lad who spends many hours indulging in two favourite hobbies: exploring, and inventing. One day, to your surprise, you stumble across a faded old map which indicates the route to a buried object marked as "The Golden Dragon". You recognise the starting-point on the map as being a wishing-well located a couple of miles away from your home. Full of anticipation, you decide to begin your quest the following day.

The next day, as the sun is rising you excitedly get out of bed, pack your rucksack with a few provisions, and then don your jet-boots — an astounding invention which enables you to fly for short periods of time. You amble over towards the wishing-well and slowly climb down the walls of the well. It's quite deep, but finally you reach the bottom. You then suddenly realise that you have left behind a very important item, the map.

You decide to press on regardless. You remember some of the places shown on the map: "The Music Room", "The Joke Shop", "The Chapel"; but, bearing in mind the size of the map, this quest will surely be the greatest challenge of your life!

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£100 is the first prize in our competition, with 20 congratulatory certificates for runners-up.
To enter the competition, you must locate the Golden Dragon, and write to us describing the final messages that you receive.
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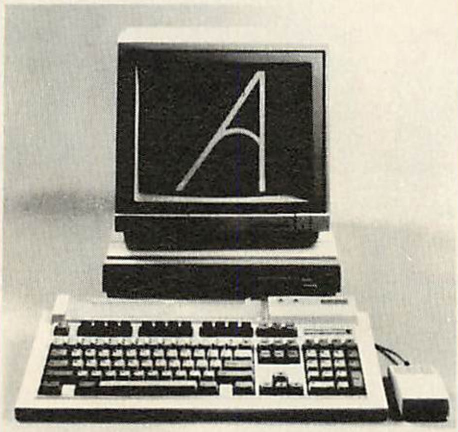
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The DTP package that does what **you** want!

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"The graphics capabilities of *Pixel Perfect* are excellent – the facilities are easy to use and a vast array of effects can be achieved."

"A useful and exciting facility is the easy import of whole screens created using any package in other graphics modes. The conversion to mode 0 and grey shading is faultless and shades may be inverted. The printout routine is very fast and makes page viewing redundant."

"Here is a DTP package that does what you want."

Micro User, May 1988

AVP

To order or for more information on the best BBC desk top publishing system available write to
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QUEST64 – An Advanced Information Handling (database) package



What is QUEST64?

Quest64 is a sophisticated Information Handling (database) system for use with the BBC Master 128 and compact microcomputers.

What can I do with QUEST64?

As with all versions of QUEST, you can manipulate, question and display data in a variety of ways.

What facilities does QUEST64 have?

It enables you to handle larger datafiles (up to 64K) extremely quickly. Alongside other enhanced commands for searching, sorting and displaying data, QUEST64 also has a video-disk 'driver' to control the actions of an Interactive video disc player.

Can I Use QUEST data with QUEST64?

Data created using both QUEST and QUEST-D can be used with QUEST64. There are data files in Home Economics, Geography and History which are available separately.

When will QUEST64 be available?

QUEST64 is available now and costs £30. To order QUEST64 or to request a catalogue of our software, contact:

The Advisory Unit for Microtechnology in Education,
Endymion Road, Hatfield, Herts AL10 8AU
Tel: (07072) 65443

ARCHIMEDES & BBC SOFTWARE

INTER-CHART

A general purpose chart and graph plotting program that can display data in the most easily understood format—graphically.

While it integrates directly with other members of the 'INTER' family it can also accept data from ASCII files, produced by WORDWISE, VIEW and programming languages such as BASIC.

Supports line, and bar graphs, pie charts and also scatter graphs. These may be automatically scaling, or the user may view any portion of the scale so allowing 'zooming' into any area of interest.

Pie charts may have highlighted segments (pulled out) with the values optionally displayed as percentages.

All graph displays may have optional text headings or messages positioned anywhere on screen. These are saved with the graph and may be edited at any time.

Multiple graphs can be held in memory at the same time. Any number of graphs may be overlaid allowing easy comparisons etc. (Not applicable to pie charts.)

Graphs may be displayed in any BBC graphics mode. The colours of bars, lines, or segments may be altered from a simple table of colours. In addition special striped colour combinations and a variety of cross hatching styles are available for bar charts.

Where appropriate either axis may be displayed with a log or linear scale, and optional dotted graduation lines are available.

INTER-CHART has built in screen dump routines for EPSON matrix printers and compatibles. Other screen dump routines may be used from within (or external to) INTER-CHART for other printers or plotters.

BBC ROM—£32.00+VAT (£36.80 incl.)
Archimedes ROM £25+VAT (£28.75 incl.)

INTER-WORD

The ultimate word processor for the BBC Micro.

The most comprehensive WYSIWYG image of the final page showing at all times, page breaks, headings, footings, bold text, underlines etc, ensuring the page on screen looks as close as possible to the final printout.

Works in 40, 53, 80 or a special 106 column screen mode and offers super-fast scrolling in all modes, even sideways scrolling if necessary.

All margin and tab settings are controlled by rulers placed in the text. These may be altered by moving the cursor onto the ruler and simply dragging the required margin or tab to the new position. All text controlled by the ruler is instantly re-formatted to the new settings.

Pull down menus may control nearly all operations—no complicated commands to remember. This ensures that it really is easy to use.

Printer control menu allows easy access to all printers' special effects and allows easy configuring to any printer. Printer codes may be saved and re-loaded—no need for special printer drivers.

A special multi-file mode enables very long documents to be generated, even to the size of a disc, yet enables simple movement to any page in the document.

File selector for all file operations. This enables fast and very simple file name selection when saving, loading etc.

Integrates directly with other members of the INTER family and with SPELLMASTER, the fastest and most flexible spelling checker available for the BBC.

BBC ROM £49+VAT (£56.35 incl.)
Archimedes ROM £39+VAT (£44.85 incl.)

INTER-SHEET

A simple to use, but very powerful spreadsheet program offering many unique features.

The fastest spreadsheet available for the BBC Micro.

The largest capacity spreadsheet. This means more data and larger spreadsheets are possible.

40, 80 and a special 106 column screen mode. Especially useful for viewing large sheets.

Multiple spreadsheets in memory at once. Data from one may be included in the calculations of other sheets.

Super-fast replication allows anything from a single box to an area of the sheet to be copied to any other position. Formulae may be automatically updated relative to their new positions.

Simple WORDWISE like cursor movement.

A unique windowing system enables any row or column to be fixed on screen, while allowing the sheet to scroll underneath. Simpler than other windowing systems yet more flexible.

While it integrates directly with INTER-WORD it can also transfer data to and from other word processors such as VIEW and WORDWISE.

A large range of standard maths functions is included in addition to special spreadsheet functions such as AVERAGE, COUNT, IF..., LOOKUP, MAX, MIN, SUM etc.

Simple auto-prompting commands structure. If you can't remember the complete command syntax, just enter the first letter and INTER-SHEET will prompt from then on.

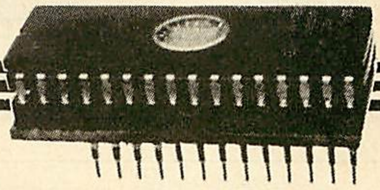
BBC ROM (2 chips) £49+VAT (£56.35 incl.)
Archimedes ROM £39+VAT (£44.85 incl.)

All the above ROMs are fully compatible with DFS, ADFS, Econet, all BBC machine variants and Watford or Aries shadow RAM boards.

MEGA 3

MEGA 3— the single chip solution

A new single 1 megabit chip containing complete versions of all the above programs is now available. This replaces 4 chips and so offers a more compact and more economic way of obtaining the above three programs.



BBC ROM £85+VAT (£97.75 incl.)
Archimedes ROM not yet available.

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TELETEXT ADAPTER

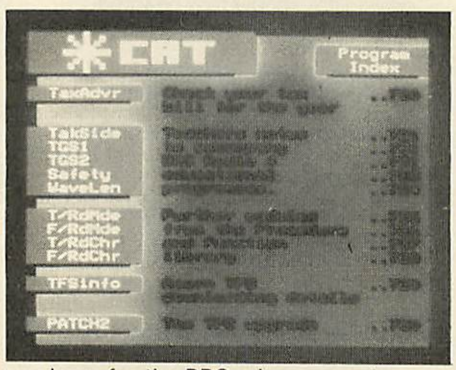


The most advanced teletext receiver available – just £134

We are so impressed by the exceptional quality of the new BBC teletext adapter, that we have negotiated a special low-price introductory offer exclusive to *Acorn User* readers.

All orders received by July 31 1988 will be supplied at £134 inclusive of VAT and delivery (normal retail price £149). The BBC teletext adapter is only available at this special price through *Acorn User*.

The Advanced Teletext Receiver from General Information Systems was developed with the co-operation of the BBC. It is the next generation of teletext receivers for the BBC microcomputer series and is the only BBC-approved teletext adapter design.



The adapter incorporates many of the advances made possible by recent developments in teletext chip technology all packed into a ruggedly built, compact box, which can be either wall-mounted or left free-standing.

Other key features include:

- Complete access to Ceefax and Oracle.
- Operates with BBC models B, B+ and Master.
- A comprehensive manual.
- The software supplied with the adapter is guaranteed to operate with BBC transmissions.
- It is the only teletext adapter with *ATS Plus* software, and an on-board dedicated microprocessor for superior performance.
- Designed for the future: the adapter offers upwards compatibility to full page teletext and picture quality teletext.

The BBC is committed to developing its telesoftware and has already made a large amount of public domain software available to its users.

Financial news, television information and the latest weather forecasts are just some of teletext's other features.

We are pleased to accept official educational orders, and educational discounts are available for orders of five or more: telephone 01-490 1444 Ext. 297 for information.

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______ Advanced Teletext Adapter(s) at £134.00 inclusive of VAT and delivery. NB: Educational discounts are available – contact Seran at *Acorn User*.

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A CLOSER LOOK

The BBC-approved GIS Teletext Receiver is bristling with features

The BBC has joined forces with General Information Systems, creators of the Red Box home security system, to launch the BBC Advanced Teletext Receiver.

The adapter gives you access to the information on Ceefax and Oracle and lets you download free telesoftware.

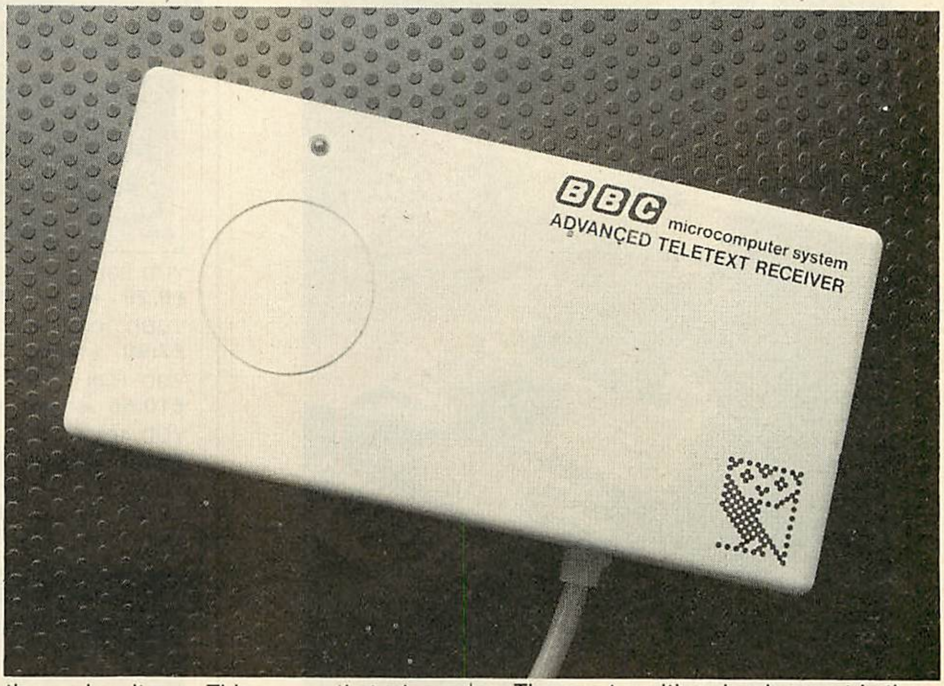
A single metre-long thick lead connects to the user port on the BBC micro or Master 128. Master Compact owners with an add-on user port will now be able to add teletext for the first time.

The adapter takes its power from the micro's 5V output. In addition, you are supplied with an *ATS Plus* ROM to install in one of the sideways ROM sockets or a ROM cartridge or expansion board. This is a new version of the *Advanced Teletext System* ROM released by the BBC two years ago.

Tuning is achieved by typing in *TELETEXT and then pressing Shift-f0. The screen displays a station tuning page, and gives simple instructions for tuning. First you have to press 'S' to start scanning through the channel wavelengths, and when a signal is located the scan is halted. This allows you to either save the station by pressing K, or S to continue scanning. A strong signal is indicated by the status report showing 'On-tune' and a good steady screen display. In some areas channels are transmitted on several wavelengths, and so you should scan through the entire selection before choosing one.

Individual teletext pages are called by simply pressing their unique three-figure number. The software also allows you to make use of the linked-pages system. At the bottom of the screen there are usually a series of coloured boxes followed by either page numbers or coloured keywords. These correspond to the four coloured blocks on the keystrip (f1 to f4). This linked-pages system certainly makes selecting any desired page much easier.

The 'kept page' feature is a really useful asset. If you are using teletext for long periods of time the terminal has the ability to keep pages for you, updating them when it can. This means that when you re-select them they appear immediately, without having to wait for them to come round.



Probably the best feature of the *ATS Plus* ROM is the way the telesoftware is handled. The Ceefax service has several pages dedicated to computer software. These are updated weekly. By pressing f5 a complete list of all the telesoftware available for the week is displayed. From this catalogue programs and files can be downloaded and saved to disc with tremendous ease. There is none of the confusion that the original TFS caused when in the telesoft mode, with its black screen and Searching message.

Since its release, the *ATS* ROM has been well supported by the BBC. For instance, the BBC has broadcast a program which allows a whole week's telesoftware to be downloaded off-air automatically. Other packages include programs that can collect the major news stories and then print them out in newspaper format. These programs will all work with the *ATS Plus* ROM too. In addition BBC Schools Broadcasting has started to use the telesoftware service for sending out details of its broadcasts.

The most exciting development is the use of *ATS* ROM commands so that your own programs can extract data from teletext pages. One example of this is a program that allows your computer to look at the weather pages on Ceefax every day, take the data and plot graphs. This allows a database of weather information from all parts of the country to be built up. In the same way, checks can be made on how your favourite football team is doing. Financial information on Ceefax also allows an automatic check on the state of your share portfolio — and you could even build a system that monitored the market, then warned you of changes.

The ROM comes with a function key strip and an excellent user guide.

There is no doubt the new Advanced Teletext Receiver is an impressive performer. One reason for the BBC's adoption of the GIS adapter is that the BBC regards its Ceefax service, and especially the telesoftware service, as an important part of an integrated system.

Perhaps the most important aspect of the adapter is that it is BBC endorsed, and so everything that is broadcast will work. If you want access to Ceefax and Oracle this is a great way to receive it.

NEXT MONTH

JUNE ISSUE



MUSIC SPECIAL

The June issue of *Acorn User* contains three computer music features. Carol Atack interviews Vince Clarke, whose group Erasure are currently riding high in the charts with 'Ship of Fools'. Vince uses a BBC micro and a UMI MIDI interface to control his synthesisers in the studio. Computer musician Ian Waugh discusses the Hybrid Technology integrated music system, centred around the Music 5000 synthesiser, and we list a piece of Ample music to type into your Music 5000. Plus Joe Telford shows you how to construct a simple drum machine of your own.

BUSINESS STUDIES

In the Education section, Chris Drage and Nick Evans discuss the use of the computer in business studies teaching. In Step By Step next month, Bruce Smith introduces *InterChart*, and shows you in easy stages how to create graphs and charts from your spreadsheet data. Plus we continue our survey of BBC databases.

ARCHIMEDES TIPS

Archimedes owners' new Arc Agora column continues with an animation program and a relocatable module to help with dumping the screen. We also take a look at *First Word Plus*, the latest Arc wordprocessor contender.

YELLOW PAGES

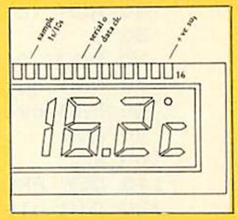
INDEX/COMPATIBILITY

Entering listings

To make the task of entering listings easier, *Acorn User* has adopted several standards in the yellow pages. Programs are listed with line numbers in increments of 10, so type AUTO <Return> for automatic line numbering before you start. Before you list what you've entered, type LISTO 1 <Return> to provide spaces after the line numbers. Programs in the yellow pages are often listed to a width of 40 characters, so type MODE 6 <Return> before you start. Comparing the line-endings of your listing with the yellow pages will help you spot extra or missing characters.

To make sure that the program you want to enter will work on your particular machine, check the index below. All the listings work with Basic 1, 2 and 4 (unless stated otherwise) and with operating systems OS1.2 or above. If a program is accompanied by an article, please read the article first. If special care is needed when entering, we provide an easy-to-complete 'How To Enter' box.

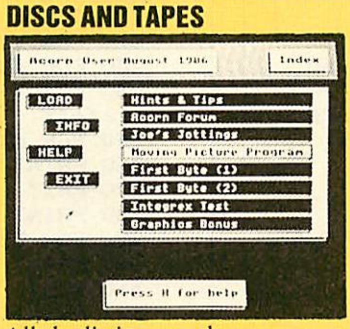
Once you've typed in your program, save it to tape or disc then test it by running it. If you have a major problem with a listing, ask someone to check it. If you still have difficulties, you can also send off for a list of *Checksums* which help you find the errors. Send a large sae (26p stamp) to *AU*Checksums, PO Box 641, London NW9 8TF.







DISCS AND TAPES



All the listings on these pages can be found on this month's listings disc or cassette. See page 134 for details of how to order.

BACK ISSUES





For help with entering and debugging listings see the following back issues: April '86, June '85, Aug '84, Sept '83.

Program	Page	BBC B	B+/128	Master 128	Master Compact	Electron	Arc	6502SP/ Turbo	ADFS	Econet	Shadow RAM	Monthly T/D
Hints & Tips	112											
Listing 1		■	■	■	■	■	■	■	■	■	■	■
Listing 2		■	■	■	■		■	■	■	■	■	■
Listing 3		■	■	■	■	■	■	■	■	■	■	■
Listing 4		■	■	■	■			■			■	■
Listing 5		■	■	■	■	■		■	■	■	■	■
Arc Agora	113											
Listing 1-4							■		■	■	■	■
Joe's Jottings	116											
Listings 1-4[1]		■	■	■	■[2]			■	■	■	■	■
Micro-Sherlock	121											
Listing 1		■	■	■	■	■	■	■	■	■	■	■
Network Page	123											
Listings 1-3		■	■	■	■			■	■	■	■	■
Logo Star Maps	95											
Listings 1-2[3]		■	■	■	■	■	■	■	■	■	■	
Top of the List	128											
Listing 1		■	■	■	■	■		■	■	■	■	■

Notes: [1] Requires Maplin Temperature module [2] Requires user port [3] Requires Logo

See Hints & Tips, page 35

Listing 1. Banner printer

```
   10 REM Side Print
   20 REM By Kieran Connell
   30 REM For BBC B/B+/M/C/E/A
   40 REM (c) Acorn User May 1988
   50 :
   60 MODE 0
   70 PROCsetup
   80 PROCdemo
   90 RUN
  100 :
  110 DEF PROCsetup
  120 DIM blk(7)
  130 VDU 23;8202;0;0;0;
  140 FOR I%=0 TO 7
  150 blk(I%)=2^(7-I%)
  160 NEXT
  170 ENDPROC
  180 :
  190 DEF PROCdemo
  200 PRINT TAB(35,1);"Side Print"
  210 PRINT TAB(35,2);"----------"
  220 PRINT TAB(31,4);"By Kieran Connell
"
  230 INPUT TAB(5,7);"Enter your text >>
>"t$
  240 IF t$="" THEN t$=">>>DEMO...DEMO..
.DEMO<<<"
  250 PRINT TAB(5,9);"How big do you wan
t your text ?"
  260 x=FNget
  270 PRINT TAB(38,9);x;" by ";
  280 y=FNget
  290 PRINT TAB(43,9);y
  300 PRINT TAB(18,12);"WARNING: Make su
re your printer is connected!"
  310 PRINT TAB(32,14);"Then press SPACE
"
  320 REPEAT UNTIL GET=32
  330 CLS
  340 PROCsideprt(t$,x,y)
  350 ENDPROC
  360 :
  370 DEF PROCsideprt(text$,xmag,ymag)
  380 VDU 2
  390 b$=STRING$(ymag,"#")
  400 s$=STRING$(ymag," ")
  410 FOR I%=1 TO LEN(t$)
  420 A%=10
  430 X%=&70
  440 Y%=0
  450 ?&70=ASC(MID$(t$,I%,1))
  460 CALL &FFF1
  470 FOR K%=0 TO (7*xmag)+xmag-1
  480 PRINT 'STRING$(40-(ymag*8)/2," ");
  490 FOR J%=8 TO 1 STEP-1
  500 IF ?(&70+J%) AND blk(K% DIV xmag)
THEN PRINT b$; ELSE PRINT s$;
  510 NEXT
  520 NEXT
  530 PRINT
  540 NEXT
  550 VDU 3
  560 ENDPROC
  570 :
  580 DEF FNget
  590 REPEAT
  600 no=GET
  610 no=no-48
  620 UNTIL no>0 AND no<10
  630 =no
```

Listing 2. Extended mode 7 characters

```
   10 REM Extra MODE 7 characters
   20 REM By John Darby
   30 REM For BBC B/B+/M/C
   40 REM (c) Acorn User May 1988
   50 :
   60 A$=" THOUSANDS MORE MODE 7 CHARACT
ERS"
   70 B$="Using double height characters
 with"
   80 C$="different characters top and b
ottom"
   90 MODE 7
  100 VDU 14
  110 ON ERROR GOTO 360
  120 PRINT ''CHR$141;A$'CHR$141;A$'
  130 PRINT ''CHR$141;B$'CHR$141;B$'CHR$
141;C$'CHR$141;C$
  140 PRINT 'SPC14;"EXAMPLE"
  150 PRINT 'CHR$141;STRING$(9,CHR$42);S
TRING$(9,CHR$94);STRING$(18,"^")'CHR$141
;STRING$(9,CHR$88);STRING$(9,"X");STRING
$(9,CHR$107);STRING$(9,CHR$120)
  160 PRINT ''"The results of various co
mbinations are"
  170 PRINT "displayed together with the
 ASCII value"
  180 PRINT "of the top and bottom halve
s making up"
  190 PRINT "each character."
  200 PRINT 'SPC7"Use SHIFT key to scrol
l"''''
  210 CLS
  220 FOR I%=32 TO 126
  230 FOR J%=32 TO 126 STEP 16
  240 PRINT "TOP ";I%;"  BOTTOM ";J%;" t
o ";J%+15
  250 FOR K%=1 TO 16
  260 PRINT CHR$141;CHR$ I%;
  270 NEXT
  280 PRINT
  290 FOR K%=0 TO 15
  300 PRINT CHR$141;CHR$(J%+K%);
  310 NEXT
  320 PRINT
  330 NEXT
  340 PRINT
  350 NEXT
  360 VDU 15
  370 END
```

Listing 3. Basic text formatter

```
   10 REM Text Formatter
   20 REM by Rob Anderson
   30 REM for B/B+/M/C/E/A
   40 REM (c) Acorn User May 1988
   50 :
   60 A$="Hello, this is a text formatti
ng package which enables neat presentati
on of strings. This has applications for
 any programs which require a lot of tex
t output, and enables left, right, centr
e and justify formatting."
   70 B$="Hanging indents are supported,
 along with normal indents. By defining
text windows, text may also be given any
 required left margin, and the line leng
th can also be specified, starting from
1 if required!"
```

Continued ►

HINTS & TIPS

◄ Hints & Tips listing 3 continued

```
   80 C$="The functions provided work wi
th normal BASIC string variables which a
re passed into the routine as a paramete
r. These routines could be used as part
of an elementary word processor which yo
u may require for a special task."
   90 :
  100 MODE 129
  110 PROCformat(0,39,"TEXT FORMATTING R
OUTINE DEMONSTRATION","CENTRE")
  120 PROCformat(0,39,STRING$(37,"="),"C
ENTRE")
  130 VDU 28,0,24,39,4;14
  140 PROCformat(0,39,"< press SHIFT to
scroll >","CENTRE")
  150 PRINT
  160 COLOUR 2
  170 PROCformat(5,39,A$,"RIGHT")
  180 PRINT
  190 COLOUR 3
  200 PROCformat(-10,30,B$,"JUSTIFY")
  210 PRINT
  220 COLOUR 2
  230 PROCformat(0,39,C$,"CENTRE")
  240 END
  250 :
  260 DEF PROCformat(ind%,ll%,A$,format$
)
  270 LOCAL width%,tc%,start%,line$,hi%,
lc%,W$,B$
  280 width%=ll%
  290 IF ABS(ind%) >=ll% OR ll%<1 OR A$=
"" PRINT "Parameter Range Error.":VDU 7:
ENDPROC
  300 tc%=0
  310 start%=TRUE
  320 line$=""
  330 IF SGN(ind%)=1 hi%=FALSE:lc%=ind%:
line$=STRING$(ind%," "):ind%=0 ELSE ind%
=ABS(ind%):hi%=TRUE:lc%=0
  340 REPEAT
  350 W$=""
  360 REPEAT
  370 tc%=tc%+1
  380 B$=MID$(A$,tc%,1)
  390 W$=W$+B$
  400 UNTIL B$=" " OR tc%=LEN A$
  410 IF RIGHT$(W$,1)=" " AND W$<>" " W$
=LEFT$(W$,LENW$-1)
  420 IF start% AND LEN W$+lc%>ll% line$
=line$+LEFT$(W$,ll%-lc%):W$=RIGHT$(W$,LE
N W$-ll%+lc%):lc%=ll%
  430 start%=FALSE
  440 lc%=lc%+LEN W$
  450 IF lc%>ll% PROCprintline(format$):
line$=STRING$(ind%," "):lc%=LEN W$:IF hi
% hi%=FALSE:ll%=ll%-ind%
  460 IF LEN W$>ll% PROCprintbigword ELS
E line$=line$+W$
  470 IF lc%+1<=ll% AND W$<>" " line$=li
ne$+" ":lc%=lc%+1
  480 UNTIL tc%=LEN A$
  490 PROCprintline(format$)
  500 ENDPROC
  510 :
  520 DEF PROCprintbigword
  530 LOCAL A%
  540 line$=line$+MID$(W$,0,ll%)
  550 FOR A%=ll%+1 TO LEN W$ STEP ll%
  560 PROCprintline(format$)
  570 line$=STRING$(ind%," ")+MID$(W$,A%
,ll%)
  580 NEXT
  590 lc%=LEN W$ MOD ll%
  600 IF lc%=0 THEN lc%=ll%
  610 ENDPROC
  620 :
  630 DEF PROCprintline(format$)
  640 IF LEN line$<width% line$=line$+ST
RING$(width%-LENline$," ")
  650 IF format$="RIGHT" PROCalignright
  660 IF format$="CENTRE" PROCcentre
  670 IF format$="JUSTIFY" PROCjustify
  680 PRINT line$
  690 ENDPROC
  700 :
  710 DEF PROCalignright
  720 REPEAT
  730 IF RIGHT$(line$,1)=" " line$=" "+L
EFT$(line$,LENline$-1)
  740 UNTIL RIGHT$(line$,1)<>" "
  750 ENDPROC
  760 :
  770 DEF PROCcentre
  780 LOCAL pointer%,C%,spaces%
  790 pointer%=width%+1
  800 C%=-1
  810 REPEAT
  820 pointer%=pointer%-1
  830 C%=C%+1
  840 UNTIL MID$(line$,pointer%,1)<>" "
OR C%=ll%
  850 spaces%=C% DIV 2
  860 line$=STRING$(spaces%," ")+line$
  870 line$=LEFT$(line$,LEN line$-spaces
%)
  880 ENDPROC
  890 :
  900 DEF PROCjustify
  910 LOCAL pointer%,C%,spaces%,point%
  920 pointer%=width%+1
  930 C%=-1
  940 REPEAT
  950 pointer%=pointer%-1
  960 C%=C%+1
  970 UNTIL MID$(line$,pointer%,1)<>" "
  980 IF C%=0 ENDPROC
  990 pointer%=-1
 1000 REPEAT
 1010 pointer%=pointer%+1
 1020 UNTIL MID$(line$,pointer%,1)<>" "
 1030 point%=pointer%
 1040 spaces%=C%
 1050 IF INSTR(MID$(line$,point%,(width%
-C%)-point%)," ",0)=FALSE ENDPROC
 1060 REPEAT
 1070 REPEAT
 1080 pointer%=pointer%+1
 1090 IF pointer%=(width%-C%)+1 pointer%
=point%
 1100 UNTIL MID$(line$,pointer%,1)=" "
 1110 line$=LEFT$(line$,pointer%)+MID$(l
ine$,pointer%,width%-pointer%)
 1120 REPEAT
 1130 pointer%=pointer%+1
 1140 UNTIL MID$(line$,pointer%,1)<>" "
 1150 C%=C%-1
 1160 UNTIL C%=0
 1170 ENDPROC
```

Listing 4. Disc catalogue hider

```
10 REM File hider
20 REM by Stuart Rogers
30 REM for B/B+/M/C
40 REM (c) Acorn User May 1988
50 :
60 MODE 7
70 osword=&FFF1
80 oscli=&FFF7
90 gsinit=&FFC2
100 gsread=&FFC5
110 base=&A00
120 buffer=&E00
130 :
140 FOR I=0 TO 1
150 :
160 FOR pass=0 TO 3 STEP 3
170 P%=base
180 [
190 OPT pass
200 SEC
210 JSR gsread
220 BCC notdefault
230 LDA #&30
240 .notdefault
250 STA string+4
260 SEC
270 SBC #&30
280 STA block
290 BMI error
300 CMP #&04
310 BPL error
320 LDA #&53
330 JSR catLS
340 :
350 LDA #&08
360 .next
370 TAX
380 LDA buffer,X
390 OPT FNaction(I)
400 STA buffer,X
410 TXA
420 CLC
430 ADC #&08
440 BNE next
450 :
460 LDA #&4B
470 JSR catLS
480 LDX #(string MOD 256)
490 LDY #(string DIV 256)
500 JSR oscli
510 RTS
520 :
530 .catLS
540 STA block+6
550 LDX #(block MOD 256)
560 LDY #(block DIV 256)
570 LDA #&7F
580 JSR osword
590 RTS
600 :
610 .error
620 BRK
630 OPT FNequb(&FF)
640 OPT FNequs("Only drives 0..3 allow
ed.")
650 OPT FNequb(0)
660 :
670 .block
680 OPT FNequb(&0)
690 OPT FNequw(buffer)
700 OPT FNequw(&FFFF)
```

Continued ►

◄ Hints & Tips listing 4 continued

```
710 OPT FNequb(3)
720 OPT FNequb(&53)
730 OPT FNequb(0)
740 OPT FNequb(0)
750 OPT FNequb(&21)
760 OPT FNequb(0)
770 :
780 .string
790 OPT FNequs("CAT  ")
800 OPT FNequb(&0D)
810 ]
820 NEXT pass
830 :
840 IF I=0 THEN *SAVE HIDE A00+74
850 IF I=1 THEN *SAVE SHOW A00+74
860 NEXT I
870 :
880 END
890 :
900 DEF FNaction(i)
910 IF i=0 THEN [OPT pass:ORA #&80:]
920 IF i=1 THEN [OPT pass:AND #&7F:]
930 =pass
940 :
950 END
960 :
970 DEF FNequb(b%)
980 ?P%=b%
990 P%=P%+1
1000 =pass
1010 :
1020 DEF FNequw(b%)
1030 ?P%=b% MOD 256
1040 P%?1=b% DIV 256
1050 P%=P%+2
1060 =pass
1070 :
1080 DEF FNequs(b$)
1090 $P%=b$
1100 P%=P%+LEN(b$)
1110 =pass
```

Listing 5. Controlled ON ERROR

```
10 REM Controllable ON ERROR
20 REM by Jonathan Temple
30 REM for B/B+/E/M/C
40 REM (c) Acorn User May 1988
50 :
60 base=&A00
70 P%=base
80 [OPT 2
90 LDA #255
100 LDX #3
110 .loop
120 STA &414,X
130 DEX
140 BPL loop
150 RTS
160 ]
170 :
180 ?&220=base
190 ?&221=base DIV 256
200 *FX 14,6
210 E%=FALSE
220 REPEAT UNTIL E%
230 PRINT "Escape pressed"
240 PRINT "Program continues"
```

ARC AGORA

See Arc Agora, page 49

Listing 1. RGB demonstration

```
 10 REM Agora - listing 1
 20 REM RGB Demonstration
 30 REM by Dave Acton
 40 REM for Archimedes only
 50 REM (c) Acorn User May 1988
 60 :
 70 MODE 12
 80 ON ERROR PROCerr
 90 OFF
100 DIM cx%(2),cy%(2),h%(2)
110 COLOUR 8,&F0,&F0,&F0
120 COLOUR 8
130 PRINTTAB(0,30)"Move mouse onto cir
cle(s) - left button increases hue, righ
t button reduces hue"
140 FOR c%=0 TO 2
150 h%(c%)=&F0
160 cx%(c%)=640+200*SINRAD(c%*120)
170 cy%(c%)=512+200*COSRAD(c%*120)
180 GCOL 1,2^c%
190 CIRCLE FILL cx%(c%),cy%(c%),260
200 NEXT
210 *POINTER 1
220 MOUSE ON 1
230 REPEAT
240 PRINTTAB(15,0)"Red=";h%(0)"   "
250 PRINTTAB(35,0)"Green=";h%(1)"   "
260 PRINTTAB(55,0)"Blue=";h%(2)"   "
270 MOUSE x%,y%,b%
280 FOR c%=0 TO 2
290 d%=SQR((x%-cx%(c%))^2+(y%-cy%(c%))
^2)
300 IF d%<260 THEN
310 IF b% AND 1 THEN
320 IF h%(c%)>0 h%(c%)=h%(c%)-2
330 ENDIF
340 IF b% AND 4 THEN
350 IF h%(c%)<&F0 h%(c%)=h%(c%)+2
360 ENDIF
370 ENDIF
380 NEXT
390 WAIT
400 FOR h%=0 TO 7
410 IF h% AND 1 r%=h%(0) ELSE r%=0
420 IF h% AND 2 g%=h%(1) ELSE g%=0
430 IF h% AND 4 b%=h%(2) ELSE b%=0
440 COLOUR h%,r%,g%,b%
450 NEXT
460 UNTIL FALSE
470 :
480 DEF PROCerr
490 *POINTER 0
500 CLS
510 PRINT REPORT$" at line ";ERL
520 END
```

Listing 2. Tint demonstration

```
 10 REM Agora - listing 2
 20 REM Tint Demonstration
 30 REM by Dave Acton
 40 REM for Archimedes only
 50 REM (c) Acorn User May 1988
 60 :
 70 MODE 13
 80 OFF
 90 DIM cx%(2),cy%(2),h%(2)
100 FOR c%=0 TO 2
110 h%(c%)=&F0
120 cx%(c%)=640+240*SINRAD(c%*120)
130 cy%(c%)=512+240*COSRAD(c%*120)
```

Continued ▶

◀ Arc Agora listing 2 continued

```
140 NEXT
150 FOR x%=0 TO 1279 STEP 4
160 FOR y%=0 TO 1023 STEP 4
170 col%=0
180 tint%=0
190 FOR c%=0 TO 2
200 d%=SQR((x%-cx%(c%))^2+(y%-cy%(c%))
^2)
210 h%=(480-d%)/30
220 IF h%<0 h%=0
230 col%=col%+(h% DIV 4)*(4^c%)
240 tint%=tint% OR (h% AND 3)
250 NEXT
260 GCOL col% TINT 64*tint%
270 POINT x%,y%
280 NEXT
290 NEXT
300 END
```

Listing 3. Life

```
 10 REM Agora - listing 3
 20 REM Life
 30 REM by Kim Latt
 40 REM for Archimedes only
 50 REM (c) Acorn User May 1988
 60 :
 70 DIM code &2200
 80 PROCsetup
 90 REPEAT
100 CALL clear
110 CLG
120 MOUSE ON 1
130 CLS
140 PRINT"Use :-"''"Mouse tomove"''"Le
ft forliving  cell"''"Right   for countc
ell"'''"<ESC> toplay"
150 REPEAT
160 MOUSE X%,Y%,F%
170 PROCp(F%,X%,Y%)
180 UNTIL INKEY(0)=27
190 CLS
200 PRINT"Press:-"''"<SPACE>"''"for nex
tgenera-"'"tion"''
210 PRINT"<ESC> toredesign"''
220 PRINT"<SHIFT>-<ESC> toquit"
230 MOUSE OFF
240 REPEAT
250 CALL generate
260 UNTIL GET=27
270 UNTIL INKEY-1
280 *POINTER 0
290 MODE 3
300 END
310 :
320 DEF PROCsetup
330 FOR pass%=0 TO 2 STEP 2
340 P%=code
350 [OPT pass%
360 .generate
370 STMDB R13!,{R14}
380 MOV R14,#&01F00000
390 ORR R14,R14,#&000D8000
400 ADR R0,map
410 LDR R1,[R0,#0]
420 EOR R2,R1,#1
430 STR R2,[R0,#0]
440 ADR R3,map+4
450 ADD R12,R3,R1,LSL #12
460 ADD R11,R3,R2,LSL #12
470 MOV R2,#&3E
```

Continued ▶

JOE'S JOTTINGS

Arc Agora listing 3 continued

```
480 .loop1
490 MOV R1,#&3E
500 ADD R7,R2,R2,LSL #2
510 ADD R7,R14,R7,LSL #8
520 ADD R7,R7,R1,LSL #2
530 SUB R5,R2,#1
540 ADD R8,R12,R5,LSL #6
550 ADD R8,R8,#&3C
560 LDR R4,[R8,#0]
570 LDR R5,[R8,#64]
580 LDR R6,[R8,#128]
590 ADD R10,R1,R2,LSL #6
600 MOV R4,R4,LSR #8
610 MOV R5,R5,LSR #8
620 MOV R6,R6,LSR #8
630 LDRB R9,[R12,R10]
640 B count
650 .loop2
660 ADD R10,R1,R2,LSL #6
670 LDRB R9,[R12,R10]
680 LDRB R0,[R8],#-1
690 ORR R4,R0,R4,LSL #8
700 LDRB R0,[R8,#65]
710 ORR R5,R0,R5,LSL #8
720 LDRB R0,[R8,#129]
730 ORR R6,R0,R6,LSL #8
740 .count
750 MOV R0,#0
760 TST R4,#&FF
770 ADDNE R0,R0,#1
780 TST R4,#&FF00
790 ADDNE R0,R0,#1
800 TST R4,#&00FF0000
810 ADDNE R0,R0,#1
820 TST R5,#&FF
830 ADDNE R0,R0,#1
840 TST R5,#&00FF0000
850 ADDNE R0,R0,#1
860 TST R6,#&FF
870 ADDNE R0,R0,#1
880 TST R6,#&FF00
890 ADDNE R0,R0,#1
900 TST R6,#&00FF0000
910 ADDNE R0,R0,#1
920 MOVS R9,R9
930 BNE alive
940 CMP R0,#3
950 MOVEQ R9,#&FF
960 B storecell
970 .alive
980 CMP R0,#2
990 BCC dies
1000 CMP R0,#4
1010 BCS dies
1020 SUBS R9,R9,#1
1030 MOVEQ R9,#255
1040 B storecell
1050 .dies
1060 MOV R9,#0
```

Continued ►

◄ Arc Agora listing 3 continued

```
1070 .storecell
1080 STRB R9,[R11,R10]
1090 ADD R3,R9,R9,LSL #8
1100 ORR R3,R3,R3,LSL #8
1110 STR R3,[R7],#-4
1120 STR R3,[R7,#324]
1130 STR R3,[R7,#644]
1140 SUBS R1,R1,#1
1150 BNE loop2
1160 SUBS R2,R2,#1
1170 BNE loop1
1180 LDMIA R13!,{PC}
1190 .clear
1200 ADR R0,map
1210 MOV R1,#0
1220 STR R1,[R0]
1230 ADR R0,map+4
1240 MOV R1,#&2000
1250 SUBS R1,R1,#4
1260 MOV R2,#0
1270 .clearloop
1280 STR R2,[R0,R1]
1290 SUBS R1,R1,#4
1300 BPL clearloop
1310 MOV PC,R14
1320 .map
1330 ]:NEXT pass%
1340 *FX 229,1
1350 MODE 13
1360 OFF
1370 RECTANGLE 0,4,1019,1019
1380 RECTANGLE 8,12,1003,1003
1390 VDU 24,16;16;1007;1007;29,0;4;28,3
2,31,39,0
1400 *POINTER 1
1410 MOUSE RECTANGLE 24,24,983,983
1420 M%=map+4
1430 ENDPROC
1440 :
1450 DEF PROCp(F%,X%,Y%)
1460 IF F% ELSE ENDPROC
1470 M%?((1008-FNa(Y%)<<2)+X%/16)=(4=F%
)
1480 MOVE FNa(X%),FNa(Y%)
1490 PLOT 97-2*(2=F%),8,8
1500 ENDPROC
1510 :
1520 DEF FNa(X%)=X% AND &FF0
```

Listing 4. Fractals

```
10 s=20*SINRAD(45):c=20*COSRAD(45):MO
DE 15:OFF:ORIGIN 640,512:INPUT j,k,l:CLS
:x=0:y=0:REPEAT:GCOL RND(64)-1 TINT (RND
(3)-1)<<6:FOR i=1 TO 500:xx=y-SGN(x)*SQR
(ABS(k*x-1)):y=j-x:x=xx:POINT x*s+y*c-48
,y*s-x*c-16:NEXT:UNTIL 0
```

See Joe's Jottings page 88

Listing 1. Temperature reader

```
10 REM Level 1 temperature reader
20 REM by Joe Telford
30 REM for B/B+/M/C + Maplin temperat
ure module
40 REM (c) Acorn User May 1988
50 :
60 PROCassemble
70 CLS
80 REPEAT
90 temp=FNreadtemp
100 PRINT TIME$,"Temp - ";temp
110 UNTIL FALSE
120 END
130 :
140 DEF FNreadtemp
150 LOCAL temp
```

Continued ►

◄ Joe's Jottings listing 1 continued

```
160 CALL start
170 tens=0
180 FOR y=1 TO 4
190 tens=tens*2+buff?y
200 NEXT y
210 units=0
220 FOR y=5 TO 8
230 units=units*2+buff?y
240 NEXT y
250 tenths=0
260 FOR y=9 TO 12
270 tenths=tenths*2+buff?y
280 NEXT y
290 temp=tens*10+units+tenths/10
300 IF ?buff=1 THEN temp=temp*-1
310 =temp
320 :
330 DEF PROCassemble
340 DIM start &100,buff 18
350 FOR pass=0 TO 3 STEP 3
360 P%=start
370 base=&70
380 [OPT pass
390 .start
400 LDY #0
410 JSR waitforpulse
420 .loop1
430 INY
440 JSR waitwhilehigh
450 CPY #12
460 BNE loop1
470 CLI
480 RTS
490 .waitwhilehigh
500 SEI
510 LDA &FE60
520 BPL waitwhilehigh
530 .waitforpulse
540 LDA &FE60
550 BMI waitforpulse
560 .separate
570 AND #&40
580 CLC
590 ROL A
600 ROL A
610 ROL A
620 EOR #1
630 STA buff,Y
640 RTS
650 ]
660 NEXT pass
670 ENDPROC
```

Listing 2. Single temperature plotter

```
10 REM Single Temperature Grapher.
20 REM by Joe Telford
30 REM for B/B+/M/C + Maplin temperat
ure module
40 REM (c) Acorn User May 1988
50 :
60 MODE 1
70 PROCassemble
80 PROCgetdetails
90 PROCdrawaxes
100 ON ERROR REPORT:END
110 :
120 lastemp=FNreadtemp
130 REPEAT
140 minutes=minutes+1
150 FOR loop%=1 TO 6
```

Continued ►

◄ Joe's Jottings listing 2 continued

```
160 A$=CHR$(INKEY(0) AND 223)
170 IF A$="P" THEN TIME=0:PROCdump:las
temp=FNreadtemp:minutes=minutes+TIME DIV
6000:loop%=6:NEXT:UNTIL 0
180 IF A$="S" THEN TIME=0:PROCsave:las
temp=FNreadtemp:minutes=minutes+TIME DIV
6000:loop%=6:NEXT:UNTIL 0
190 IF A$="R" THEN RUN
200 temp=FNreadtemp
210 IF A$="X" THEN loop%=6
220 NEXT
230 GCOL 0,3
240 MOVE leftx+((minutes-1)/60)*xscale
,ybase+(lastemp-low)*yscale
250 DRAW leftx+(minutes/60)*xscale,yba
se+(temp-low)*yscale
260 lastemp=temp
270 PRINT TAB(0,0);STRING$(40," ");
280 PRINT TAB(0,0);TIME$;": Temp - ";t
emp
290 UNTIL A$="X"
300 CLS
310 END
320 :
330 DEF PROCsave
340 *SAVE TEMFILE FFFF3000 +5000
350 ENDPROC
360 :
370 DEF FNreadtemp
380 LOCAL temp
390 CALL start
400 tens=0
410 FOR y=1 TO 4
420 tens=tens*2+buff?y
430 NEXT y
440 units=0
450 FOR y=5 TO 8
460 units=units*2+buff?y
470 NEXT y
480 tenths=0
490 FOR y=9 TO 12
500 tenths=tenths*2+buff?y
510 NEXT y
520 temp=tens*10+units+tenths/10
530 IF ?buff=1 THEN temp=temp*-1
540 =temp
550 :
560 DEF PROCassemble
570 DIM start &100,buff 18
580 FOR pass=0 TO 3 STEP 3
590 P%=start
600 base=&70
610 [OPT pass
620 .start
630 LDY #0
640 JSR waitforpulse
650 .loop1
660 INY
670 JSR waitwhilehigh
680 CPY #12
690 BNE loop1
700 CLI
710 RTS
720 .waitwhilehigh
730 LDA &FE60
740 BPL waitwhilehigh
750 .waitforpulse
760 SEI
770 LDA &FE60
780 BMI waitforpulse
790 .separate
800 AND #&40
810 CLC
```

Continued ►

◀ Joe's Jottings listing 2 continued

```
 820 ROL A
 830 ROL A
 840 ROL A
 850 EOR #1
 860 STA buff,Y
 870 RTS
 880 ]
 890 NEXT pass
 900 ENDPROC
 910 :
 920 DEF PROCxaxis(t,b,x,time)
 930 LOCAL loop%
 940 FOR loop%=t TO b STEP-8
 950 PLOT 69,x,loop%
 960 NEXT
 970 IF ABS(INT(time+tgap/2)-time) <(tg
ap/2) THEN MOVE x,b-16:DRAW x,b:VDU 5:PR
INT;(INT(time+tgap/2) MOD 24)DIV 10:MOVE
 x,b-32:PRINT;(INT(time+tgap/2) MOD 24)M
OD 10:VDU 4
 980 ENDPROC
 990 :
1000 DEF PROCyaxis(r,L,y,temp)
1010 LOCAL loop%
1020 FOR loop%=r TO L STEP-8
1030 PLOT 69,loop%,y
1040 NEXT
1050 IF (temp MOD 5)=0 AND temp=INT tem
p DRAW L-16,y:MOVE 0,y:VDU 5:PRINT;temp:
VDU 4
1060 ENDPROC
1070 :
1080 DEF PROCrect(x,y,l,w,f)
1090 MOVE x,y
1100 DRAW x+l,y
1110 IF f=0 DRAW x+l,y+w ELSE PLOT 85,x
,y+w
1120 IF f=0 DRAW x,y+w ELSE PLOT 85,x+l
,y+w
1130 MOVE x,y+w
1140 IF f=0 DRAW x,y ELSE MOVE x,y
1150 ENDPROC
1160 :
1170 DEF PROCdump
1180 DIM P%3,Q%3
1190 !P%=&03010000
1200 !Q%=&03020100
1210 MOVE 0,0
1220 VDU 29,0;0;2,1,27,1,65,1,8,1,10
1230 FOR Y%=1020 TO 12 STEP-16
1240 VDU 1,27,1,76,1,192,1,3
1250 FOR X%=0 TO 1276 STEP 4
1260 A%=0:B%=0
1270 FOR Z%=0 TO 12 STEP 4
1280 C%=POINT(X%,Y%-Z%)
1290 A%=A%*4+P%?C%
1300 B%=B%*4+Q%?C%
1310 NEXT
1320 VDU 1,A%,1,B%,1,A%
1330 NEXT
1340 VDU 1,10
1350 NEXT
1360 VDU 1,27,1,64,3
1370 ENDPROC
1380 :
1390 DEF PROCgetdetails
1400 CLS
1410 PRINT
1420 INPUT "What is the lowest temp you
 expect? "low
1430 INPUT '"What is the highest temp y
ou expect? "high
```

Continued ▶

◀ Joe's Jottings listing 2 continued

```
1440 INPUT '"Graph lines every how many
 degrees? "degap
1450 IF degap=0 THEN degap=1
1460 INPUT '"Record for how long in hou
rs? "len
1470 INPUT '"graph lines every how many
 minutes? ";tgap
1480 IF tgap=0 THEN tgap=60
1490 tgap=tgap/60
1500 INPUT '"What start time in hours?
"strt
1510 end=strt+len
1520 INPUT '"How many mins are we into
that time? "minutes
1530 leftx=100
1540 xdist=1130
1550 ybase=80
1560 ydist=844
1570 xscale=xdist/len
1580 yscale=ydist/(high-low)
1590 CLS
1600 ENDPROC
1610 :
1620 DEF PROCdrawaxes
1630 GCOL 0,1
1640 PROCrect(leftx,ybase,xdist,ydist,0
)
1650 FOR time=strt TO end+tgap/2 STEP t
gap
1660 xpos=leftx+(time-strt)*xscale
1670 PROCxaxis(ybase+ydist,ybase,xpos,t
ime)
1680 NEXT
1690 FOR temp=low TO high STEP degap
1700 ypos=ybase+(temp-low)*yscale
1710 PROCyaxis(leftx+xdist,leftx,ypos,t
emp)
1720 NEXT
1730 ENDPROC
```

Listing 3. Twin temperature plotter

```
  10 REM Twin Temperature Grapher
  20 REM by Joe Telford
  30 REM for B/B+/M/C + Maplin temperat
ure module
  40 REM (c) Acorn User May 1988
  50 :
  60 MODE 1
  70 PROCassemble
  80 PROCgetdetails
  90 PROCdrawaxes
 100 ON ERROR REPORT:END
 110 :
 120 ?&FE62=1
 130 lastemp=FNreadtemp
 140 lastemp2=FNreadtemp
 150 REPEAT
 160 minutes=minutes+1
 170 FOR loop%=1 TO 6 STEP 2
 180 A$=CHR$(INKEY(0) AND 223)
 190 IF A$="P" THEN TIME=0:PROCdump:las
temp=FNreadtemp:lastemp2=FNreadtemp:minu
tes=minutes+TIME DIV 6000:loop%=6:NEXT:U
NTIL FALSE
 200 IF A$="S" THEN TIME=0:PROCsave:las
temp=FNreadtemp:lastemp2=FNreadtemp:minu
tes=minutes+TIME DIV 6000:loop%=6:NEXT:U
NTIL FALSE
 210 IF A$="R" THEN RUN
 220 temp=FNreadtemp
```

Continued ▶

◀ **Joe's Jottings listing 3 continued**

```
  230 temp2=FNreadtemp
  240 IF A$="X" THEN loop%=6
  250 NEXT
  260 GCOL 0,3
  270 MOVE leftx+((minutes-1)/60)*xscale
,ybase+(lastemp-low)*yscale
  280 DRAW leftx+(minutes/60)*xscale,yba
se+(temp-low)*yscale
  290 lastemp=temp
  300 GCOL 0,2
  310 MOVE leftx+((minutes-1)/60)*xscale
,ybase+(lastemp2-low)*yscale
  320 DRAW leftx+(minutes/60)*xscale,yba
se+(temp2-low)*yscale
  330 lastemp2=temp2
  340 PRINT TAB(0,0);STRING$(40," ");
  350 PRINT TAB(0,0);"Temp1 - ";temp;":
Temp2 - ";temp2
  360 UNTIL A$="X"
  370 CLS
  380 END
  390 :
  400 DEF PROCsave
  410 *SAVE TEMFILE FFFF3000 +5000
  420 ENDPROC
  430 :
  440 DEF FNreadtemp
  450 LOCAL temp
  460 CALL start
  470 tens=0
  480 FOR y=1 TO 4
  490 tens=tens*2+buff?y
  500 NEXT
  510 units=0
  520 FOR y=5 TO 8
  530 units=units*2+buff?y
  540 NEXT
  550 tenths=0
  560 FOR y=9 TO 12
  570 tenths=tenths*2+buff?y
  580 NEXT
  590 temp=tens*10+units+tenths/10
  600 IF ?buff=1 THEN temp=temp*-1
  610 ?&FE60=1-(?&FE60 AND 1)
  620 =temp
  630 :
  640 DEF PROCassemble
  650 DIM start &100,buff 18
  660 FOR PASS=0 TO 3 STEP 3
  670 P%=start
  680 base=&70
  690 [OPT PASS
  700 .start
  710 LDY #0
  720 JSR waitforpulse
  730 .loop1
  740 INY
  750 JSR waitwhilehigh
  760 CPY #12
  770 BNE loop1
  780 CLI
  790 RTS
  800 .waitwhilehigh
  810 LDA &FE60
  820 BPL waitwhilehigh
  830 .waitforpulse
  840 SEI
  850 LDA &FE60
  860 BMI waitforpulse
  870 .separate
  880 AND #&40
  890 CLC
  900 ROL A
  910 ROL A
  920 ROL A
  930 EOR #1
  940 STA buff,Y
  950 RTS
  960 ]
  970 NEXT
  980 ENDPROC
  990 :
 1000 DEF PROCxaxis(t,b,x,time)
 1010 LOCAL loop%
 1020 FOR loop%=t TO b STEP-8
 1030 PLOT 69,x,loop%
 1040 NEXT
 1050 IF ABS(INT(time+tgap/2)-time) <(tg
ap/2) THEN MOVE x,b-16:DRAW x,b:VDU 5:PR
INT;(INT(time+tgap/2) MOD 24)DIV 10:MOVE
 x,b-32:PRINT;(INT(time+tgap/2) MOD 24)M
OD 10:VDU 4
 1060 ENDPROC
 1070 :
 1080 DEF PROCyaxis(r,L,y,temp)
 1090 LOCAL loop%
 1100 FOR loop%=r TO L STEP-8
 1110 PLOT 69,loop%,y
 1120 NEXT
 1130 IF (temp MOD 5)=0 AND temp=INT tem
p THEN DRAW L-16,y:MOVE 0,y:VDU 5:PRINT;
temp:VDU 4
 1140 ENDPROC
 1150 :
 1160 DEF PROCrect(x,y,l,w,f)
 1170 MOVE x,y:DRAW x+l,y
 1180 IF f=0 DRAW x+l,y+w ELSE PLOT 85,x
,y+w
 1190 IF f=0 DRAW x,y+w ELSE PLOT 85,x+l
,y+w
 1200 MOVE x,y+w:IF f=0 DRAW x,y ELSE MO
VE x,y
 1210 ENDPROC
 1220 :
 1230 DEF PROCdump
 1240 DIM P%3,Q%3
 1250 !P%=&03010000
 1260 !Q%=&03020100
 1270 MOVE 0,0
 1280 VDU 29,0;0;2,1,27,1,65,1,8,1,10
 1290 FOR Y%=1020 TO 12 STEP-16
 1300 VDU 1,27,1,76,1,192,1,3
 1310 FOR X%=0 TO 1276 STEP 4
 1320 A%=0:B%=0
 1330 FOR Z%=0 TO 12 STEP 4
 1340 C%=POINT(X%,Y%-Z%)
 1350 A%=A%*4+P%?C%
 1360 B%=B%*4+Q%?C%
 1370 NEXT
 1380 VDU 1,A%,1,B%,1,A%
 1390 NEXT
 1400 VDU 1,10
 1410 NEXT
 1420 VDU 1,27,1,64,3
 1430 ENDPROC
 1440 :
 1450 DEF PROCgetdetails
 1460 CLS
 1470 PRINT
 1480 INPUT "What is the lowest temp you
 expect? "low
 1490 INPUT '"What is the highest temp y
ou expect? "high
 1500 INPUT '"Graph lines every how many
 degrees? "degap: IF degap=0 THEN degap=
1
```

Continued ▶

YELLOW PAGES

JOE'S JOTTINGS

◄ **Joe's Jottings listing 3 continued**

```
 1510 INPUT '"Record for how long in hou
rs? "len
 1520 INPUT '"graph lines every how many
 minutes? ";tgap:IF tgap=0 THEN tgap=60
 1530 tgap=tgap/60
 1540 INPUT '"What start time in hours?
"strt
 1550 end=strt+len
 1560 INPUT '"How many mins are we into
that time? "minutes
 1570 leftx=100
 1580 xdist=1130
 1590 ybase=80
 1600 ydist=844
 1610 xscale=xdist/len
 1620 yscale=ydist/(high-low)
 1630 CLS
 1640 ENDPROC
 1650 :
 1660 DEF PROCdrawaxes
 1670 GCOL 0,1
 1680 PROCrect(leftx,ybase,xdist,ydist,0
)
 1690 FOR time=strt TO end+tgap/2 STEP t
gap
 1700 xpos=leftx+(time-strt)*xscale
 1710 PROCxaxis(ybase+ydist,ybase,xpos,t
ime)
 1720 NEXT
 1730 FOR temp=low TO high STEP degap
 1740 ypos=ybase+(temp-low)*yscale
 1750 PROCyaxis(leftx+xdist,leftx,ypos,t
emp)
 1760 NEXT
 1770 ENDPROC
```

Listing 4. Module installer

```
   10 REM Temperature mo
dule installer
   20 REM by Joe Telford
   30 REM for B/B+/M/C +
 Maplin temperature modu
le
   40 REM (c) Acorn User
 May 1988
   50 :
   60 PROCassemble
   70 PROCchecksum
   80 CALL code
   90 *SAVE "TCP" 900+20
0
  100 CLS
  110 PRINT "Install wit
h *TCP / disable with BR
EAK"
  120 PRINT '"Warning! d
o not use memory from &9
00"
  130 PRINT "to &AFF wit
hout disabling TCP"
  140 END
  150 :
  160 DEF PROCassemble
  170 code=&900
  180 temp%=&450
  190 FOR PASS=0 TO 3 ST
EP 3
  200 P%=code
  210 base=&70
  220 oldv=&74
  230 [OPT PASS
  240 .code
  250 SEI
  260 LDA &206
  270 STA oldv
  280 LDA &207
  290 STA oldv+1
  300 LDA #start MOD 256
  310 STA &206
  320 LDA #start DIV 256
  330 STA &207
  340 LDA #&E
  350 STA &FE6C
  360 LDA #&90
  370 STA &FE6E
  380 LDA &FE60
  390 CLI
  400 RTS
  410 .start
  420 LDA &FC
  430 PHA
  440 TXA
  450 PHA
  460 TYA
  470 PHA
  480 LDA &FE6D
  490 AND #&10
  500 CMP #&10
  510 BEQ mine
  520 JMP exit
  530 .mine
  540 LDA &FE60
  550 SEI
  560 LDA &FE60
  570 LDA #0
  580 STA base
  590 STA base+1
  600 STA base+2
  610 STA base+3
  620 JSR waitforpulse
  630 STA base
  640 LDX #4
  650 .loop1
  660 JSR waitwhilehigh
  670 CLC
  680 ROL (base+1)
  690 CLC
  700 ADC base+1
  710 STA base+1
  720 CLC
  730 DEX
  740 BNE loop1
  750 LDX #4
  760 .loop2
  770 JSR waitwhilehigh
  780 CLC
  790 ROL (base+2)
  800 CLC
  810 ADC base+2
  820 STA base+2
  830 CLC
  840 DEX
  850 BNE loop2
  860 LDX #4
  870 .loop3
  880 JSR waitwhilehigh
  890 CLC
  900 ROL (base+3)
  910 CLC
  920 ADC base+3
  930 STA base+3
  940 CLC
  950 DEX
  960 BNE loop3
  970 CLC
  980 LDA #0
  990 STA temp%
 1000 STA temp%+1
 1010 STA temp%+2
 1020 STA temp%+3
 1030 LDX #100
 1040 LDA base+1
 1050 STA temp%
 1060 .hundreds
 1070 DEX
 1080 BEQ onward
 1090 LDA temp%
 1100 ADC base+1
 1110 STA temp%
 1120 BCC hundreds
 1130 LDA #0
 1140 ADC temp%+1
 1150 STA temp%+1
 1160 CLC
 1170 JMP hundreds
 1180 .onward
 1190 LDX #11
 1200 CLC
 1210 .tens
 1220 DEX
 1230 BEQ units
 1240 LDA temp%
 1250 ADC base+2
 1260 STA temp%
 1270 BCC tens
 1280 LDA #0
 1290 ADC temp%+2
 1300 STA temp%+2
 1310 CLC
 1320 JMP tens
 1330 .units
 1340 CLC
 1350 LDA temp%
 1360 ADC base+3
 1370 STA temp%
 1380 LDA #0
 1390 ADC temp%+2
```

Continued ►

◄ Joe's Jottings listing 4 continued

```
1400 STA temp%+2
1410 CLC
1420 LDA base
1430 BEQ exit1
1440 LDA #&FF
1450 EOR temp%
1460 STA temp%
1470 LDA #&FF
1480 EOR temp%+1
1490 STA temp%+1
1500 LDA #&FF
1510 EOR temp%+2
1520 STA temp%+2
1530 LDA #&FF
1540 EOR temp%+3
1550 STA temp%+3
1560 CLC
1570 LDA temp%
1580 ADC #1
1590 STA temp%
1600 LDA #0
1610 ADC temp%+1
1620 STA temp%+1
1630 LDA #0
1640 ADC temp%+2
1650 STA temp%+2
1660 LDA #0
1670 ADC temp%+3
1680 STA temp%+3
1690 CLC
1700 .exit1
1710 LDA #&90
1720 STA &FE6E
1730 LDA &FE60
1740 CLI
1750 LDA &FE60
1760 .exit
1770 PLA
1780 TAY
1790 PLA
1800 TAX
1810 PLA
1820 STA &FC
1830 JMP (oldv)
1840 .waitwhilehigh
1850 LDA &FE60
1860 BPL waitwhilehigh
1870 .waitforpulse
1880 LDA &FE60
1890 BMI waitforpulse
1900 .separate
1910 AND #&40
1920 CLC
1930 ROL A
1940 BMI zero
1950 LDA #1
1960 RTS
1970 .zero
1980 LDA #0
1990 RTS
2000 ]
2010 NEXT
2020 ENDPROC
2040 DEF PROCchecksum
2050 C=0
2060 FOR I%=&900 TO &A4
E
2070 C=C+?(I%)
2080 NEXT I%
2090 IF C<>&82DB PRINT
"Check listing.":END
2100 ENDPROC
```

See Elementary My Dear Micro, page 81

Listing 1. Micro-Sherlock

```
10 REM Micro-Sherlock
20 REM by David Acton
30 REM for B/B+/M/C/E/A
40 REM (c) Acorn User May 1988
50 :
60 MODE 3
70 PROCinitvars
80 sherly%=FNhelp
90 ON ERROR PROCerr
100 REPEAT
110 REPEAT
120 INPUT"->"com$
130 IF ASC(com$)=42 PROCoscli(com$):co
m$=""
140 PROCanalyse(com$)
150 UNTIL word$(0)<>""
160 recog%=FALSE
170 RESTORE
180 REPEAT
190 READ key$
200 IF word$(0)=key$ dummy%=EVAL("FN"+
key$):recog%=TRUE
210 UNTIL key$="" OR recog%
220 IF word$(numw%-1)="?" PRINT FNquer
y(0):recog%=TRUE
230 IF NOT recog% dave%=FNeval(0,1)
240 UNTIL FALSE
250 :
260 DEF FNeval(e%,et%)
270 IF numw%=3+e% newfact%=FNfactnum(F
Ncalcfactno(e%,e%+1,e%+2),et%):=e%+3
280 IF numw%=4+e% AND word$(e%+2)="not
" newfact%=FNfactnum(FNcalcfactno(e%,e%+
1,e%+3),et% EOR 1):=e%+4
290 PRINT"Please rephrase"
300 =0
310 :
320 DEF PROCinitvars
330 DIM fact%(100),cond$(100)
340 DIM type%(100),true%(100)
350 DIM cond%(100),s% 255
360 DIM vocab$(200),word$(15)
370 numf%=0
380 vocsize%=0
390 numcond%=0
400 ENDPROC
410 :
420 DEF PROCanalyse(s$)
430 $s%=s$
440 numw%=0
450 p%=0
460 REPEAT
470 REPEAT
480 IF p%?s%=32 p%=p%+1
490 UNTIL p%?s%<>32
500 s2%=p%+s%
510 REPEAT
520 IF p%?s%>32 p%?s%=p%?s% OR 32:p%=p
%+1
530 UNTIL p%?s%<=32 OR p%?s%=ASC"?"
540 t%=p%?s%
550 p%?s%=13
560 p%=p%+1
570 word$(numw%)=$s2%
580 numw%=numw%+1
590 IF t%=ASC"?" word$(numw%)="?":numw
%=numw%+1:t%=p%?s%
600 UNTIL t%=13
610 ENDPROC
620 :
630 DEF FNfactnum(fact%,t%)
640 LOCAL i%
650 IF numf%=0 THEN =FNaddfact(fact%,t
%)
660 i%=-1
670 REPEAT
680 i%=i%+1
690 UNTIL i%=numf% OR fact%=fact%(i%)
700 IF i%=numf% OR type%(i%)<>t% THEN
=FNaddfact(fact%,t%)
710 =i%
720 :
730 DEF FNaddfact(fact%,t%)
740 fact%(numf%)=fact%
750 type%(numf%)=t%
760 numf%=numf%+1
770 =numf%-1
780 :
```

Continued ►

◀ **Elementary My Dear Micro listing 1 continued**

```
  790 DEF FNquery(q%)
  800 LOCAL i%,answer%,answer$
  810 IF numf%=0 THEN ="But I don't know
 anything yet"
  820 IF numw%<q%+3 THEN ="Please rephra
se your question"
  830 query%=FNcalcfactno(q%,q%+1,q%+2)
  840 PROCcleartruths
  850 answer%=FNt(query%)
  860 IF answer%=0 THEN ="Statement is F
ALSE"
  870 IF answer%=-1 THEN ="Statement is
TRUE"
  880 ="Insufficient data!"
  890 :
  900 DEF FNtest
  910 PRINT FNquery(1)
  920 =0
  930 :
  940 DEF FNt(fact%)
  950 LOCAL i%,ty%,
  960 ty%=-1
  970 REPEAT
  980 ty%=ty%+1
  990 i%=-1
 1000 REPEAT
 1010 i%=i%+1
 1020 UNTIL i%=numf% OR (fact%=fact%(i%)
 AND ty%=type%(i%))
 1030 UNTIL ty%=8 OR i%<numf%
 1040 IF i%=numf% THEN =1
 1050 IF true%(i%)=1 PRINT"(Unknown: ";F
Nfax(i%);")"
 1060 IF true%(i%)=1 AND (type%(i%) AND
4) THEN =FNonlytrue(EVAL(cond$(cond%(i%)
)))
 1070 =true%(i%)
 1080 :
 1090 DEF FNonlytrue(t%)
 1100 IF t%<0 THEN =-1
 1110 =1
 1120 :
 1130 DEF FNhelp
 1140 PRINT'"Micro-Sherlock 1.0"
 1150 PRINT'"Valid keywords:"
 1160 RESTORE
 1170 REPEAT
 1180 READ key$
 1190 PRINT"  "key$
 1200 UNTIL key$=""
 1210 =0
 1220 :
 1230 DEF FNlist
 1240 IF word$(1)="words" OR numw%=1 PRO
Clistwords
 1250 IF word$(1)="facts" OR numw%=1 PRO
Clistfax
 1260 =0
 1270 :
 1280 DEF PROClistwords
 1290 IF vocsize%=0 PRINT"No words":ENDP
ROC
 1300 PRINT"Words:"
 1310 FOR i%=0 TO vocsize%-1
 1320 PRINT"  "vocab$(i%);
 1330 REPEAT
 1340 VDU 32
 1350 UNTIL POS MOD 20=0
 1360 NEXT
 1370 PRINT
 1380 ENDPROC
 1390 :
 1400 DEF PROClistfax
 1410 IF numf%=0 PRINT"No facts":ENDPROC
 1420 FOR t%=0 TO 7
 1430 IF t% AND 1 PRINT"True"; ELSE PRIN
T"False";
 1440 IF t% AND 2 PRINT", supposed";
 1450 IF t% AND 4 PRINT", dependent";
 1460 PRINT
 1470 tot%=0
 1480 FOR i%=0 TO numf%-1
 1490 IF type%(i%)=t% PRINT"  "FNfax(i%)
:tot%=tot%+1
 1500 NEXT
 1510 IF tot%=0 PRINT"  None"
 1520 NEXT
 1530 ENDPROC
 1540 :
 1550 DEF FNfax(f%)
 1560 LOCAL base$
 1570 base$=vocab$(fact%(f%) MOD 200)+"
"+vocab$((fact%(f%) DIV 200) MOD 200)+"
"+vocab$(fact%(f%) DIV 40000)
 1580 IF type%(f%) AND 4 THEN =base$+" (
"+cond$(cond%(f%))+")"
 1590 =base$
 1600 :
 1610 DEF FNwordnum(w$)
 1620 IF vocsize%=0 THEN =FNaddword(w$)
 1630 i%=-1
 1640 REPEAT
 1650 i%=i%+1
 1660 UNTIL vocab$(i%)=w$ OR i%=vocsize%
 1670 IF i%=vocsize% THEN =FNaddword(w$)
 1680 =i%
 1690 :
 1700 DEF FNaddword(w$)
 1710 IF vocsize%=200 PRINT"ERROR: Word
memory full"':END
 1720 vocab$(vocsize%)=w$
 1730 vocsize%=vocsize%+1
 1740 =vocsize%-1
 1750 :
 1760 DEF FNsuppose:=FNeval(1,3)
 1770 :
 1780 DEF FNtrue:=FNeval(1,1)
 1790 :
 1800 DEF FNfalse:=FNeval(1,0)
 1810 :
 1820 DEF FNif
 1830 LOCAL i%
 1840 i%=-1
 1850 REPEAT
 1860 i%=i%+1
 1870 UNTIL word$(i%)="then" OR i%=numw%
 1880 IF i%=numw% PRINT"No THEN":=FALSE
 1890 newfact%=FNfactnum(FNcalcfactno(i%
+1,i%+2,i%+3),5)
 1900 cond%(newfact%)=numcond%
 1910 cond$(numcond%)=FNcond(1)
 1920 numcond%=numcond%+1
 1930 =0
 1940 :
 1950 DEF FNforget
 1960 numf%=0
 1970 vocsize%=0
 1980 numcond%=0
 1990 =0
 2000 :
 2010 DEF FNcond(c%)
 2020 IF word$(c%+3)="then" THEN =FNwhat
fact
 2030 IF word$(c%+3)="and" THEN=FNwhatfa
ct+" AND "+FNcond(c%+4)
```

Continued ▶

NETWORK PAGE

◄ **Elementary My Dear Micro listing 1 continued**

```
 2040 IF word$(c%+3)="or" THEN=FNwhatfac
t+" OR "+FNcond(c%+4)
 2050 PRINT"Bad condition"
 2060 ="1"
 2070 :
 2080 DEF FNwhatfact
 2090 ="FNt("+STR$(fact%(FNfactnum(FNcal
cfactno(c%,c%+1,c%+2),9)))+")"
 2100 :
 2110 DEF PROCcleartruths
 2120 IF numf%=0 THEN ENDPROC
 2130 LOCAL i%,t%
 2140 FOR i%=0 TO numf%-1
 2150 IF (type%(i%) AND 4) true%(i%)=1 E
LSE true%(i%)=((type%(i%) AND 1)=1)
 2160 NEXT
 2170 ENDPROC
 2180 :
 2190 DEF FNcalcfactno(w1%,w2%,w3%)
 2200 =FNwordnum(word$(w1%))+200*FNwordn
um(word$(w2%))+40000*FNwordnum(word$(w3%
))
 2210 :
 2220 DEF PROCerr
 2230 IF INKEY-1 CLS:END
 2240 REPORT
 2250 PRINT
 2260 ENDPROC
 2270 :
 2280 DEF PROCoscli(o$)
 2290 $s%=o$
 2300 X%=s% MOD 256
 2310 Y%=s% DIV 256
 2320 CALL &FFF7
 2330 ENDPROC
 2340 :
 2350 DATA help,list,suppose,if,test
 2360 DATA forget,true,false,""
```

See Network Page, page 164

Listing 1. GDUMP source code

```
   10 REM GDUMP source
   20 REM by Alistair Sh
immin
   30 REM for B/B+/M/C w
ith Basic 2 & Econet
   40 REM (c) Acorn User
 May 1988
   50 :
   60 osword=&FFF1
   70 osbyte=&FFF4
   80 osargs=&FFDA
   90 zbloc=&A8
  100 :
  110 PROCclearmem
  120 FOR I%=4 TO 7 STEP
 3
  130 P%=&E10:O%=&910
  140 :
  150 [OPT I%
  160 .cbyte
  170 EQUB &90
  180 .masterflag
  190 EQUB 0
  200 .shadow
  210 EQUB 1
  220 .finishedflag
  230 EQUB 0
  240 EQUD 0
  250 EQUD 0
  260 EQUD 0
  270 EQUW 0
  280 .start
  290 LDY #0
  300 LDA #2
  310 LDX #&A8
  320 JSR &FFDA
  330 CMP #2
  340 BNE not334
  350 LDA #1
  360 JSR &FFDA
  370 LDY #&FF
  380 .findspace
  390 INY
  400 LDA (&A8),Y
  410 CMP #13
  420 BEQ noparams
  430 CMP #&20
  440 BNE findspace
  450 .skipspace
  460 INY
  470 LDA(&A8),Y
  480 CMP #&20
  490 BEQ skipspace
  500 CMP #13
  510 BEQ noparams
  520 JSR shiftparms
  530 JMP noparams
  540 .not334
  550 LDA #1
  560 JSR &FFDA
  570 LDY #0
  580 LDA (&A8),Y
  590 CMP #13
  600 BEQ noparams
  610 JSR shiftparms
  620 .noparams
  630 LDA #235
  640 STA blk1+2
  650 STA blk2+2
  660 LDA #0
  670 STA blk1+3
  680 STA blk2+3
  690 JSR master
  700 LDA #&A0
  710 LDX #&55
  720 JSR osbyte
  730 STX data
  740 LDX #&50
  750 JSR osbyte
  760 STX data+1
  770 STY data+2
  780 SEI
  790 LDA #&A0
  800 LDX #&4E
  810 JSR osbyte
  820 STX data+4
  830 LDA #&A0
  840 CLI
  850 LDX #&60
  860 JSR osbyte
  870 STX data+5
  880 STX cols
  890 .colloop
  900 LDX #cols MOD 256
  910 LDY #cols DIV 256
  920 LDA #&B
  930 JSR osword
  940 LDX cols
  950 LDA cols+1
  960 STA data+6,X
  970 DEC cols
  980 BPL colloop
  990 .testescape
 1000 BIT &FF
 1010 BPL noescape
 1020 .escape
 1030 JSR resetshadow
 1040 LDA #&7C
 1050 JMP osbyte
 1060 .noescape
 1070 LDX #blk1 MOD 256
 1080 LDY #blk1 DIV 256
 1090 JSR transmit
 1100 BMI testescape
 1110 LDA #&A0
 1120 LDX #&4E
 1130 JSR osbyte
 1140 STX blk2+9
 1150 .screenloop
 1160 LDA cbyte
 1170 STA blk2
 1180 LDA blk2+9
 1190 STA blk2+5
 1200 CLC
 1210 ADC #&14
 1220 CMP #&80
 1230 BCC notfinished
 1240 LDA #&80
 1250 INC finishedflag
 1260 .notfinished
 1270 STA blk2+9
 1280 .trans2
 1290 LDX #blk2 MOD 256
 1300 LDY #blk2 DIV 256
 1310 JSR transmit
 1320 BEQ exit
 1330 JMP skipexec
 1340 EQUD 0
 1350 EQUD 0
 1360 EQUB 0
 1370 EQUD start OR &FFF
F0000
 1380 .skipexec
 1390 BIT &FF
```

Continued ►

◄ Network Page listing 1 continued

```
1400 BPL clear
1410 JMP escape
1420 .clear
1430 JMP trans2
1440 .transmit
1450 LDA #&10
1460 JSR osword
1470 .testtransmit
1480 LDA #&32
1490 JSR osbyte
1500 TXA
1510 BMI testtransmit
1520 ASL A
1530 RTS
1540 .exit
1550 LDA cbyte
1560 EOR #1
1570 STA cbyte
1580 LDA finishedflag
1590 BEQ screenloop
1600 LDA masterflag
1610 BEQ skipreset
1620 JSR resetshadow
1630 .skipreset
1640 RTS
1650 .master
1660 LDY #255
1670 LDX #0
1680 LDA #&81
1690 JSR &FFF4
1700 CPX #&FF
1710 BEQ nomaster
1720 STX masterflag
1730 JSR readshadowstat
e
1740 .nomaster
1750 RTS
1760 .readshadowstate
1770 LDA #&84
1780 JSR &FFF4
1790 CPY #&80
1800 BNE noshadow
1810 LDA #0
1820 STA shadow
1830 LDA #108
1840 LDX #1
1850 LDY #0
1860 JSR &FFF4
1870 .noshadow
1880 RTS
1890 .resetshadow
1900 LDX shadow
1910 BNE exitreset
1920 LDY #0
1930 LDA #108
1940 JSR &FFF4
1950 .exitreset
1960 RTS
1970.shiftparms
1980 LDX #&17
1990.nextshift
2000 LDA (&A8),Y
2010 STA data,X
2020 CMP #13
2030 BEQ shiftend
2040 INX
2050 INY
2060 JMP nextshift
2070 .shiftend
2080 INX
2090 TXA
2100 CLC
2110 ADC blk1+4
2120 STA blk1+8
2130 LDA blk1+5
2140 ADC #0
2150 STA blk1+9
2160 RTS
2170 EQUD 0
2180 .blk1
2190 EQUD &0000A090
2200 EQUD (&FFFF0000 OR
data)
2210 EQUD (&FFFF0000 OR
(data+24))
2220 .blk2
2230 EQUD &0000A191
2240 EQUD &FFFF0000
2250 EQUD &FFFF8000
2260 .data
2270 EQUD 0
2280 EQUD 0
2290 EQUD 0
2300 EQUD 0
2310 EQUD 0
2320 EQUW 0
2330 EQUB 0
2340 EQUB 13
2350 .cols
2360 EQUW 0
2370 .end
2380 ]
2390 NEXT
2400 :
2410 PROCchecksum
2420 PRINT '" *SAVE GDU
MP 910 ";STR$~O%;" FFFF0
E22 FFFF0E10"
2430 PRINT '"Push SPACE
BAR to SAVE, or ESCAPE t
o STOP"
2440 REPEAT UNTIL GET=3
2
2450 OSCLI("SAVE GDUMP
910 "+STR$~O%+" FFFF0E22
FFFF0E10")
2460 END
2470 :
2480 DEF PROCclearmem
2490 FOR I%=&910 TO &AC
D
2500 ?I%=0
2510 NEXT I%
2520 ENDPROC
2530 :
2540 DEF PROCchecksum
2550 C=0
2560 FOR I%=&910 TO &AC
D
2570 C=C+?(I%)
2580 NEXT I%
2590 IF C<>&B541 THEN P
RINT "Check listing.":EN
D
2600 ENDPROC
```

Listing 2. NDUMP source code

```
10 REM NDUMP source
20 REM by Alistair Sh
immin
30 REM for BBC B/B+/M
/C with Econet and Basic
2
40 REM (c) Acorn User
May 1988
50 :
60 osword=&FFF1
70 osbyte=&FFF4
80 osargs=&FFDA
90 zbloc=&A8
100 :
110 PROCclearmem
120 FOR I%=4 TO 7 STEP
3
130 P%=&E10:O%=&910
140 [OPT I%
150 .cbyte
160 EQUB &90
170 .masterflag
180 EQUB 0
190 .shadow
200 EQUB 1
210 .finishedflag
220 EQUB 0
230 .tries
240 EQUB 20
250 .rxdel
260 LDX rxblk
270 LDA #&34
280 JMP &FFF4
290 EQUD 0
300 EQUB 0
310 .start
320 LDX #rxblk MOD 256
330 LDY #rxblk DIV 256
340 LDA #&11
350 JSR &FFF1
360 .txloop
370 LDX #bcastblk MOD
256
380 LDY #bcastblk DIV
256
390 JSR transmit
400 BEQ exittx
410 .giveup
420 JSR rxdel
430 BRK
440 EQUB 11
450 EQUS"Net failure"
460 EQUB 0
470 .exittx
480 .pollrx
490 LDA #19
500 JSR &FFF4
510 LDX rxblk
520 LDA #&33
530 JSR &FFF4
540 TXA
550 BMI exitrx
560 DEC tries
570 BNE pollrx
580 JSR rxdel
590 BRK
600 EQUB 11
610 EQUS"No station on
line"
620 EQUB 0
630 .exitrx
640 LDX #rxblk MOD 256
```

Continued ►

◀ **Network Page listing 2 continued**

```
 650 LDY #rxblk DIV 256
 660 LDA #&11
 670 JSR &FFF1
 680 .setreceivestno
 690 LDA rxblk+3
 700 STA blk1+2
 710 STA blk2+2
 720 LDA rxblk+4
 730 STA blk1+3
 740 STA blk2+3
 750 JSR master
 760 LDA #&A0
 770 LDX #&55
 780 JSR osbyte
 790 STX data
 800 LDX #&50
 810 JSR osbyte
 820 STX data+1
 830 STY data+2
 840 SEI
 850 LDA #&A0
 860 LDX #&4E
 870 JSR osbyte
 880 STX data+4
 890 LDA #&A0
 900 CLI
 910 LDX #&60
 920 JSR osbyte
 930 STX data+5
 940 STX cols
 950 .colloop
 960 LDX #cols MOD 256
 970 LDY #cols DIV 256
 980 LDA #&B
 990 JSR osword
 1000 LDX cols
 1010 LDA cols+1
 1020 STA data+6,X
 1030 DEC cols
 1040 BPL colloop
 1050 .testescape
 1060 BIT &FF
 1070 BPL noescape
 1080 .escape
 1090 JSR resetshadow
 1100 LDA #&7C
 1110 JMP osbyte
 1120 .noescape
 1130 LDX #blk1 MOD 256
 1140 LDY #blk1 DIV 256
 1150 JSR transmit
 1160 BMI testescape
 1170 LDA #&A0
 1180 LDX #&4E
 1190 JSR osbyte
 1200 STX blk2+9
 1210 .screenloop
 1220 LDA cbyte
 1230 STA blk2
 1240 LDA blk2+9
 1250 STA blk2+5
 1260 JMP skipexec
 1270 EQUD 0
 1280 EQUW 0
 1290 EQUB 0
 1300 EQUD start OR &FFFF0000
 1310 .skipexec
 1320 CLC
 1330 ADC #&14
 1340 CMP #&80
 1350 BCC notfinished
 1360 LDA #&80
 1370 INC finishedflag
 1380 .notfinished
 1390 STA blk2+9
 1400 .trans2
 1410 LDX #blk2 MOD 256
 1420 LDY #blk2 DIV 256
 1430 JSR transmit
 1440 BEQ exit
 1450 BIT &FF
 1460 BPL clear
 1470 JMP escape
 1480 .clear
 1490 JMP trans2
 1500 .transmit
 1510 LDA #&10
 1520 JSR osword
 1530 .testtransmit
 1540 LDA #&32
 1550 JSR osbyte
 1560 TXA
 1570 BMI testtransmit
 1580 ASL A
 1590 RTS
 1600 .exit
 1610 LDA cbyte
 1620 EOR #1
 1630 STA cbyte
 1640 LDA finishedflag
 1650 BEQ screenloop
 1660 LDA masterflag
 1670 BEQ skipreset
 1680 JSR resetshadow
 1690 .skipreset
 1700 RTS
 1710 .master
 1720 LDY #255
 1730 LDX #0
 1740 LDA #&81
 1750 JSR &FFF4
 1760 CPX #&FF
 1770 BEQ nomaster
 1780 STX masterflag
 1790 JSR readshadowstate
 1800 .nomaster
 1810 RTS
 1820 .readshadowstate
 1830 LDA #&84
 1840 JSR &FFF4
 1850 CPY #&80
 1860 BNE noshadow
 1870 LDA #0
 1880 STA shadow
 1890 LDA #108
 1900 LDX #1
 1910 LDY #0
 1920 JSR &FFF4
 1930 .noshadow
 1940 RTS
 1950 .resetshadow
 1960 LDX shadow
 1970 BNE exitreset
 1980 LDY #0
 1990 LDA #108
 2000 JSR &FFF4
 2010 .exitreset
 2020 RTS
 2030 .masterflag
 2040 EQUB 0
 2050 .shadow
 2060 EQUB 1
 2070 .numberstore
 2080 EQUB 0
 2090 .tries
 2100 EQUB 20
 2110 .blk1
 2120 EQUD &0000A090
 2130 EQUD (&FFFF0000 OR data)
 2140 EQUD (&FFFF0000 OR (data+24))
 2150 .blk2
 2160 EQUD &0000A191
 2170 EQUD &FFFF0000
 2180 EQUD &FFFF8000
 2190 .bcastblk
 2200 EQUD &FFFF9F90
 2210 EQUS "NDUMP "
 2220 EQUW 0
 2230 .rxblk
 2240 EQUB 0
 2250 EQUB &7F
 2260 EQUB &9E
 2270 EQUW 0
 2280 EQUD rxdata OR &FFFF0000
 2290 EQUD &FFFF0000 OR rxdata+4
 2300 .rxdata
 2310 EQUD 0
 2320 .data
 2330 EQUD 0
 2340 EQUD 0
 2350 EQUD 0
 2360 EQUD 0
 2370 EQUD 0
 2380 EQUW 0
 2390 EQUB 0
 2400 EQUB 13
 2410 .cols
 2420 EQUW 0
 2430 .end
 2440 ]
 2450 NEXT
 2460 :
 2470 PROCchecksum
 2480 PRINT " *SAVE NDUMP 910 ";STR$~O%;" FFFF0E22 FFFF0E10"
 2490 PRINT '"Push SPACE BAR to SAVE, or ESCAPE to STOP"
 2500 REPEAT UNTIL GET=32
 2510 OSCLI("SAVE NDUMP 910 "+STR$~O%+" FFFF0E22 FFFF0E10")
 2520 END
 2530 :
 2540 DEF PROCclearmem
 2550 FOR I%=&910 TO &AE0
 2560 ?I%=0
 2570 NEXT I%
 2580 ENDPROC
 2590 :
 2600 DEF PROCchecksum
 2610 C=0
 2620 FOR I%=&910 TO &AE0
 2630 C=C+?(I%)
 2640 NEXT I%
 2650 IF C<>&B9F4 THEN PRINT "Check listing.":END
 2660 ENDPROC
```

Listing 3 Printer server

```
10 REM PSHORT
20 REM by Alistair Shimmin
30 REM for B/B+/M/C with Econet and Basic 2
40 REM (c) Acorn User May 1988
50 :
60 *FX 200,1
70 CLOSE# 0
80 MODE 0
90 VDU 2,1,7,3
100 PROCa
110 d=0:t=1000:a=10
120 DIM b &80,bl &30, O &10
130 ?bl=5:bl?1=255:X%=bl:Y%=X% DIV 256
140 A%=&13:CALL &FFF1
150 ?r=FNr(&9F,0,bu,&10)
160 ?&220=c% MOD 256:?&221=c% DIV 256
170 *FX 14,4
180 PROCs
190 s=0
200 REPEAT
210 ?sa=0
220 rx=FNr(0,0,b,&80)
230 REPEAT
240 c=FNp(rx)
250 UNTIL c>127
260 PROCr(rx)
270 p=bl?2
280 IF (p=&D1 OR p=&A0) THEN PROCd
290 UNTIL FALSE
300 END
310 :
320 DEF PROCd
330 m=(bl!9-bl!5)
340 s=bl!3 AND &FFFF
350 ?st=s MOD 256
360 st?1=s DIV 256
370 IF p=&D1 PROCc(d)
380 IF FNo=0 THEN PROCy
390 IF p=&A0 THEN PROCg
400 PROCs
410 ENDPROC
420 :
430 DEF PROCy
440 IF p=&D1 AND c=&82 THEN PROCp
450 ENDPROC
460 :
470 DEF PROCs
480 CLS
490 VDU 23,1,0;0;0;0;
500 PRINT TAB(2,10)"Graphics Dump and Printer Server Active"
510 ENDPROC
520 :
530 DEF PROCc(de)
540 w=TIME
550 REPEAT UNTIL TIME>w+de
560 ?b=0:tr=0
570 REPEAT
580 tr=tr+1
590 PROCt(c,re,s,b,1)
600 UNTIL FNo=0 OR tr=a
610 ENDPROC
620 :
630 DEF PROCp
640 ?sa=1
650 CLS
660 PROCb
670 l=c
680 REPEAT
690 rx=FNr(&D1,s,b,&80)
700 ty=TIME
710 REPEAT
720 c=FNp(rx)
730 UNTIL c>127 OR TIME>ty+t
740 IF c>127 THEN PROCe
750 UNTIL (c AND 4)=4 OR c<128
760 IF c<128 THEN PROCx(rx)
770 VDU 2,1,12,3
780 CLS
790 ENDPROC
800 :
810 DEF PROCe
820 PROCr(rx)
830 m=(bl!9-bl!5)
840 IF c<>l THEN PROCo
850 PROCc(d)
860 IF FNo>0 THEN c=0
870 ENDPROC
880 :
890 DEF PROCo
900 l=c
910 IF c=&82 THEN ENDPROC
920 VDU 2
930 FOR I%=1 TO m
940 VDU 1,?(b+I%-1)
950 NEXT
960 VDU 3
970 ENDPROC
980 :
990 DEF PROCb
1000 VDU 2
1010 PRINT "Econet Station ";
1020 IF (s DIV 256)>0 THEN PRINT ;s DIV 256;".";
1030 PRINT ;s AND &FF;" at ";:*PTIME
1040 PRINT " on ";:PROCl("PDATE")
1050 PRINT '
1060 VDU 3
1070 ENDPROC
1080 :
1090 DEF PROCn
1100 VDU 2,1,12,3
1110 ENDPROC
1120 :
1130 DEF PROCg
1140 ?sa=1
1150 mo=?b
1160 IF NOT(mo=3 OR mo=6) THEN PROCb
1170 sc=(b!1 AND &FFFF0000) DIV &FFFF
1180 sr=b!1 AND &FFFF
1190 co=b?5
1200 e$=FNs($(b+23))
1210 IF mo=7 THEN S%=(sr DIV 256-&74) EOR &20:SL%=sr MOD 256 ELSE S%=sr DIV 8 DIV 256:SL%=sr DIV 8 MOD 256
1220 VDU 22,mo
1230 FOR I%=0 TO co
1240 VDU 19,I%,b?(6+I%);0;
1250 NEXT
1260 VDU 23;12,S%;0;0;0;
1270 VDU 23;13,SL%;0;0;0;
1280 ?&350=sr MOD 256
1290 ?&351=sr DIV 256
1300 cz=&90
1310 REPEAT
1320 rx=FNr(&A1,s,sc,sc+&1400)
1330 sz=TIME
1340 REPEAT
1350 c=FNp(rx)
1360 UNTIL c>127 OR TIME>sz+t
1370 IF c>127 THEN PROCx(rx) ELSE PROCr(rx)
1380 IF c=cz THEN sc=sc+&1400:cz=cz EOR 1
1390 UNTIL sc>=&8000 OR c<128
```

Continued ►

◄ Network Page listing 3 continued

```
1400 IF c>127 THEN PROCz
1410 IF NOT(mo=3 OR mo=6) THEN PROCn
1420 VDU 22,0
1430 ENDPROC
1440 :
1450 DEF PROCz
1460 PROCr(rx)
1470 IF NOT(mo=3 OR mo=6) THEN PROCu
1480 ENDPROC
1490 :
1500 DEF PROCu
1510 VDU 2
1520 IF mo=0 AND e$="" THEN PROCl("GDUM
P 1 0 3 1") ELSE PROCl("GDUMP "+e$)
1530 ENDPROC
1540 :
1550 DEF FNr(p,st,bf,le)
1560 ?bl=0:bl?1=&7F
1570 bl?2=p:bl!3=st
1580 bl!5=bf:bl!9=bf+le
1590 X%=bl:Y%=X% DIV 256
1600 A%=&11:CALL &FFF1
1610 =?bl
1620 :
1630 DEF FNp(n)
1640 X%=n:A%=&33
1650 =(USR(&FFF4) AND &FF00) DIV &100
1660 :
1670 DEF PROCr(n)
1680 ?bl=n
1690 X%=bl:Y%=X% DIV 256
1700 A%=&11:CALL &FFF1
1710 ENDPROC
1720 :
1730 DEF PROCt(cn,p,st,be,le)
1740 ?bl=cn:bl?1=p
1750 bl!2=st:bl!4=be
1760 bl!8=be+le
1770 X%=bl:Y%=X% DIV 256
1780 A%=&10:CALL &FFF1
1790 ENDPROC
1800 :
1810 DEF FNo
1820 REPEAT
1830 A%=&32
1840 rs=(USR(&FFF4) AND &FF00) DIV &100
1850 UNTIL rs<128
1860 =rs
1870 :
1880 DEF PROCx(n)
1890 A%=&34:X%=n:CALL &FFF4
1900 ENDPROC
1910 :
1920 DEF FNs(A$)
1930 IF RIGHT$(A$,1)<>" " THEN =A$
1940 REPEAT
1950 A$=LEFT$(A$,LEN(A$)-1)
1960 UNTIL RIGHT$(A$,1)<>" "
1970 =A$
1980 :
1990 DEF PROCl($0)
2000 X%=0:Y%=X% DIV 256:CALL &FFF7
2010 ENDPROC
2020 :
2030 DEF PROCa
2040 DIM c% &150
2050 FOR I%=0 TO 2 STEP 2
2060 P%=c%
2070 [OPT I%
2080 .e:PHP:PHA:TYA:PHA:TXA:PHA
2090 LDX r:LDA #&33:JSR &FFF4
2100 TXA:BMI ra
2110 .ex
2120 PLA:TAX:PLA:TAY:PLA:PLP:RTS
2130 .ra
2140 LDA r:STA rb
2150 LDX #rb MOD 256:LDY #rb DIV 256
2160 LDA #&11:JSR &FFF1
2170 LDA rb+3:STA cy+2
2180 LDA rb+4:STA cy+3
2190 LDX #5
2200 LDA #0:STA nm:STA ne:STA nz
2210 .na
2220 LDA bu,X:CMP #ASC"a":BCC do
2230 CMP #ASC"z"+1:BCS do
2240 AND #&5F
2250 .do
2260 CMP pr,X:BEQ th
2270 INC nm
2280 .th
2290 CMP pi,X:BEQ te
2300 INC ne
2310 .te
2320 CMP pn,X:BEQ tz
2330 INC nz
2340 .tz
2350 DEX:BPL na
2360 LDA nm:BEQ g
2370 LDA ne:BEQ g
2380 LDA nz:BEQ g
2390 JMP ei
2400 .g
2410 LDA #5:STA tr
2420 .ta
2430 JSR su
2440 LDA sa:STA bu
2450 LDA st:STA bu+1
2460 LDA st+1:STA bu+2
2470 DEC tr:BEQ ei
2480 LDX #tx MOD 256:LDY #tx DIV 256
2490 LDA #&10:JSR &FFF1
2500 .po
2510 LDA #&32:JSR &FFF4
2520 TXA:BMI po
2530 BNE ta
2540 .ei
2550 JSR se
2560 LDX #rb MOD 256:LDY #rb DIV 256
2570 LDA #&11:JSR &FFF1
2580 LDA rb:STA r
2590 JMP ex
2600 .se
2610 LDX #12
2620 .rz
2630 LDA cp,X:STA rb,X
2640 DEX:BPL rz
2650 RTS
2660 .su
2670 LDX #11
2680 .tl
2690 LDA cy,X:STA tx,X
2700 DEX:BPL tl
2710 RTS
2720 .tr OPT FNu(0)
2730 .r OPT FNu(0)
2740 .nm OPT FNu(0)
2750 .ne OPT FNu(0)
2760 .nz OPT FNu(0)
2770 .rb:OPT FNu(0)
2780 OPT FNu(&7F)
2790 OPT FNu(&9F)
2800 OPT FNe(0)
2810 OPT FNq(bu)
2820 OPT FNq(bu+&10)
2830 .cp:OPT FNu(0)
2840 OPT FNu(&7F)
```

Continued ►

◄ **Network Page listing 3 continued**

```
2850 OPT FNu(&9F)
2860 OPT FNe(0)
2870 OPT FNq(bu)
2880 OPT FNq(bu+&10)
2890 .tx:OPT FNu(0)
2900 OPT FNu(&9E)
2910 OPT FNe(0)
2920 OPT FNq(bu)
2930 OPT FNq(bu+3)
2940 .cy:OPT FNu(&80)
2950 OPT FNu(&9E)
2960 OPT FNe(0)
2970 OPT FNq(bu)
2980 OPT FNq(bu+3)
2990 .sa OPT FNu(0)
3000 .st OPT FNe(0)
3010 .pr:OPT FNA("NDUMP ")
3020 .pi:OPT FNA("PLOT  ")
3030 .pn:OPT FNA("PRINT ")
3040 .bu:OPT FNq(0):OPT FNq(0):OPT FNq(
0):OPT FNq(0)
3050 ]
3060 NEXT
3070 ENDPROC
3080 :
3090 DEF FNe(w%)
3100 !P%=w%:P%=P%+2
3110 =I%
3120 :
3130 DEF FNq(d%)
3140 !P%=d%:P%=P%+4
3150 =I%
3160 :
3170 DEF FNu(b%)
3180 !P%=b%:P%=P%+1
3190 =I%
3200 :
3210 DEF FNA(s$)
3220 FOR i%=1 TO LEN(s$)
3230 ?P%=ASC(MID$(s$,i%,1)):P%=P%+1
3240 NEXT
3250 =I%
```

Top of the List

Listing 1. Mode 4 LQ800 screen dump

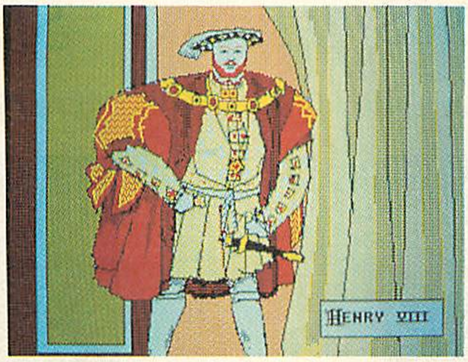
```
10 REM Tiny MODE 4 LQ
-800 Dump
20 REM by David Lawre
nce
30 REM for B/B+/M/C/E
40 REM (c) Acorn User
April 1988
50 :
60 *FX 5,1
70 MODE 4
80 PROCcode
90 PROCchecksum
100 PROCdemo
110 CALL dump4
120 END
130 :
140 DEF PROCcode
150 pos1=&70:pos2=&72:
pos3=&74
160 lines=&76:chars=&7
7:times=&78
170 oswrch=&FFEE
180 FOR I%=0 TO 2 STEP
2
190 P%=&900
200 [OPT I%
210 .dump4
220 LDY #6
230 .initloop
240 LDA init,Y
250 STA pos1,Y
260 DEY
270 BPL initloop
280 .perline
290 LDA #2
300 JSR oswrch
310 LDA #27
320 JSR print
330 LDA #42
340 JSR print
350 LDA #39
360 JSR print
370 LDA #320 MOD 256
380 JSR print
390 LDA #320 DIV 256
400 JSR print
410 LDA #40
420 STA chars
430 .perchar
440 LDY #7
450 .transfer
460 LDA (pos1),Y
470 STA space,Y
480 LDA (pos2),Y
490 STA space+8,Y
500 LDA (pos3),Y
510 STA space+16,Y
520 DEY
530 BPL transfer
540 LDA #8
550 STA times
560 .output
570 LDX #0
580 JSR rotate
590 LDX #8
600 JSR rotate
610 LDX #16
620 JSR rotate
630 DEC times
640 BNE output
650 LDY #0
660 JSR add8
670 LDY #2
680 JSR add8
690 LDY #4
700 JSR add8
710 DEC chars
720 BNE perchar
730 LDY #0
740 .eolloop
750 LDA eoldat,Y
760 JSR print
770 INY
780 CPY #7
790 BNE eolloop
800 LDY #0
810 JSR add280
820 LDY #2
830 JSR add280
840 LDY #4
850 JSR add280
860 DEC lines
870 BPL perline
880 LDA #13
890 JSR oswrch
900 LDA #3
910 JSR oswrch
920 RTS
930 :
940 .add8
950 LDA pos1,Y:CLC:ADC
#8:STA pos1,Y
960 LDA pos1+1,Y:ADC #
0:STA pos1+1,Y
970 RTS
980 :
990 .add280
1000 LDA pos1,Y:CLC:ADC
#&80:STA pos1,Y
1010 LDA pos1+1,Y:ADC #
2:STA pos1+1,Y
1020 RTS
1030 :
1040 .rotate
1050 CPX #16
1060 BNE notendline
1070 LDA lines
1080 BEQ print
1090 .notendline
1100 LDY #8
1110 LDA #0
1120 .rotloop
1130 ROL space,X
1140 ROL A
1150 INX
1160 DEY
1170 BNE rotloop
1180 :
1190 .print
1200 PHA
1210 LDA #1
1220 JSR oswrch
1230 PLA
1240 JMP oswrch
1250 :
1260 .space
1270 OPT FNequs(STRING$
(24," "))
1280 :
1290 .init
1300 OPT FNequw(&5800)
1310 OPT FNequw(&5940)
1320 OPT FNequw(&5A80)
1330 OPT FNequb(10)
1340 :
1350 .eoldat
1360 OPT FNequb(27):OPT
FNequb(74):OPT FNequb(2
4)
1370 OPT FNequb(27):OPT
FNequb(36):OPT FNequb(0
):OPT FNequb(0)
1380 ]NEXT
1390 ENDPROC
1400 :
1410 DEF PROCdemo
1420 FOR I%=0 TO 32 STE
P 8
1430 MOVE I%,I%
1440 DRAW 1279-I%,I%
1450 DRAW 1279-I%,1023-
I%
1460 DRAW I%,1023-I%
1470 DRAW I%,I%
1480 NEXT
1490 FOR R%=0 TO 450 ST
EP 50
1500 MOVE 640,512
1510 PLOT 145,R%,0
1520 NEXT
1530 PRINT TAB(5,15);SP
C30
1540 PRINT TAB(6,16);SP
C30
1550 VDU 5
1560 MOVE 5*32,16*32+15
1570 PRINT "This is a M
ODE 4 demonstration"
1580 VDU 4
1590 ENDPROC
1600 :
1610 DEF FNequb(b%)
1620 ?P%=b%
1630 P%=P%+1
1640 =I%
1650 :
1660 DEF FNequw(b%)
1670 ?P%=b% MOD 256
1680 P%?1=b% DIV 256
1690 P%=P%+2
1700 =I%
1710 :
1720 DEF FNequs(b$)
1730 $P%=b$
1740 P%=P%+LEN(b$)
1750 =I%
1760 :
1770 DEF PROCchecksum
1780 C=0
1790 FOR I%=&900 TO &9F
D
1800 C=C+?(I%)
1810 NEXT I%
1820 IF C<>24589 PRINT
"Check listing.":END
1830 ENDPROC
```

OFFERS

THIS MONTH'S LISTINGS

With your tomatoes beginning to show in the greenhouse you have to watch out for late frosts. Joe Telford's temperature control program could be just what you need. Temperature levels are printed out in graph form, so you are warned as the weather changes. Also a great way to monitor your fuel bills! If artificial intelligence is in your line, use the reasoning powers of Micro-Sherlock. Arc Agora includes Peter Conway's Game of Life. Show the speed of your Arc off to friends with our fractal program.

Have you ever wanted to print out a banner to wish Mum a happy birthday? Now you have the chance with the listings disc for May. The security minded may need our file hider program – blank out files from prying eyes. May's disc also contains thousands of new characters for mode 7. A three-second Mandlebrot is a bonus program for Arc owners.



Taking the temperature with Joe's Jottings

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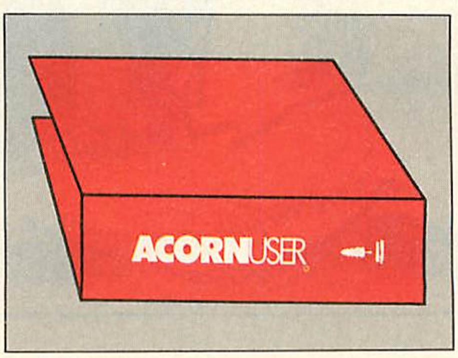


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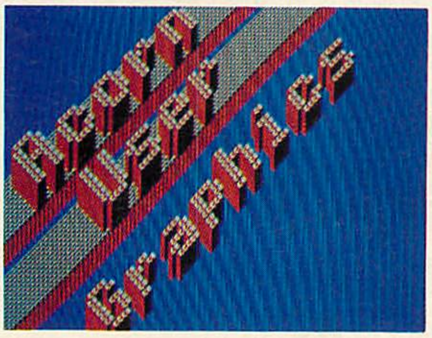
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OFFERS

SOFTWARE GRAPHICS

Great graphics utilities



The 40-track 5.25-inch *Graphics Utilities* disc, keenly priced at £7.95, features 16 stand-alone machine code utilities, an advanced teletext editor, several useful Basic procedures, an easy-to-adapt disc header and index.

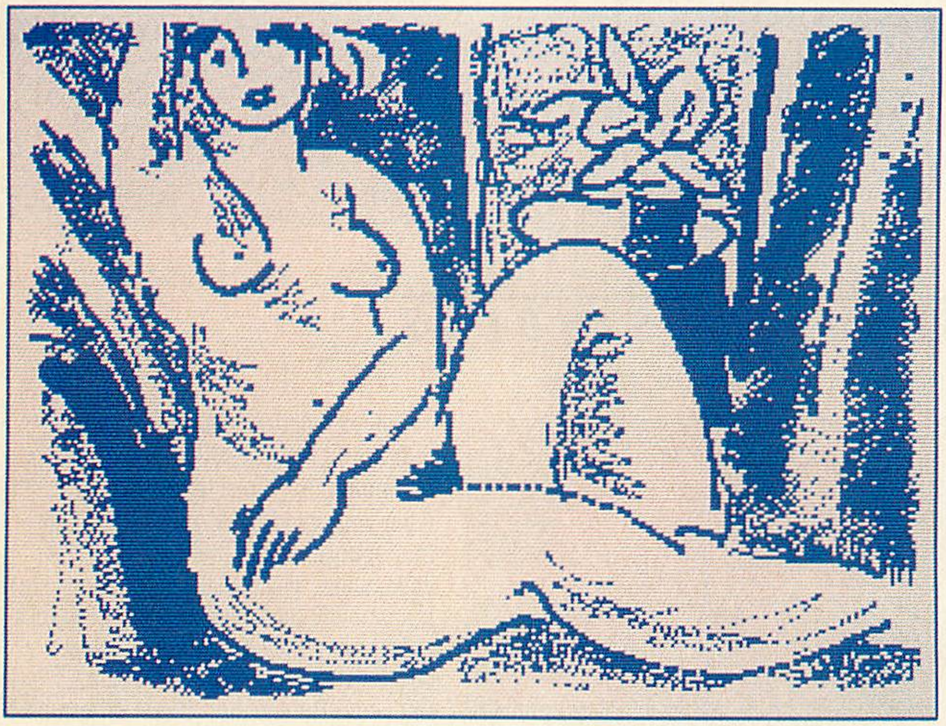
Included are: *ROTATE; rotates area through 180 degrees; *SWAPCOL; swaps two colours; *COLFILL; a colour fill routine; *SVPIC; saves a compacted picture; *LDPIC; reloads a compacted picture. There are many utilities to manipulate graphics.

Sideways RAM made simple



The *Acorn User* sideways RAM disc gives you many more utilities for your sideways RAM. These include: RAMpad – your computers answer to the pad and pen; six different on-screen fonts available in all modes; a 15k printer buffer; Screen Swap – store and recall mode 4 or 5 screens; *ROMHEAD – standard service ROM header; *RLOOK – allows you to examine sideways RAM or ROM.

There are many more utilities on this 40/80-track 5.25-inch disc and it's a snip at £9.95.



Micro masterpieces on Portfolio for £9.95

Jonathon Inglis, freelance illustrator, has assembled a *Portfolio* of his best work exclusively for *Acorn User*.

The disc contains screens that have been used by national and regional publications. Included are Seurat's Bathers, a *Time Out* cover from August 1985, and two familiar *Acorn User* covers, Willow, (Nov '86) and Magician (Jan '86), as well as several pictures commissioned by *The Times*.

Three of Jonathon's favourite masterpieces are on the disc, Seurat's Riverside, Vermeer's Lady at the Virginal and a copy of a famous lithograph by Matisse. Sade fans will probably be more interested in the two stunning portraits of the singer included on the disc.

You can create your own *piece de resistance* using the Pixel Editor and Super Painter programs. Pixel Editor allows you to draw in and alter minute detail, while Super Painter enables you to draw lines, texture your screen and shade by mixing the eight standard colours.

Portfolio comes in 80-track 5.25-inch format with a comprehensive instruction sheet telling you about the pictures and how the artist created them. This disc can be yours for only £9.95.

TO ORDER USE THE FORM ON PAGE 134

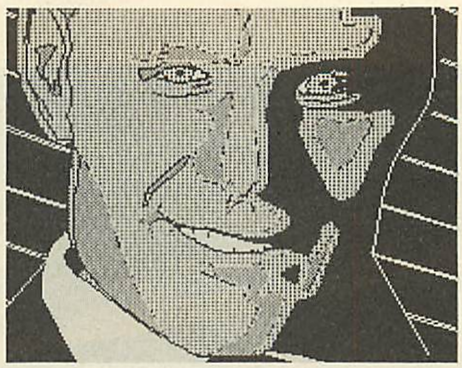
OFFERS

USERDUMP ROM

BBC/B/ B+/M/ C

The *UserDump* ROM will allow you to dump any screen image in any display mode by entering a single command – either as a line of your program or by typing it directly from the keyboard. A perfect dump can also be obtained while a machine code program is running.

UserDump can dump a graphics window, make a distortion-free dump of mode 0 screens using plotter graphics, translate a teletext screen into mode 1, and shift any area of memory.

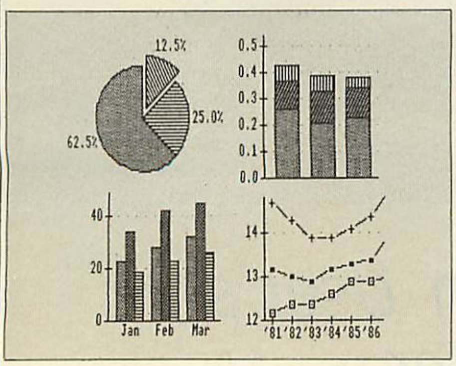


UserDump will work with any Epson-compatible printer which has single-density and double-density bit-image graphics including the Star Gemini, Delta, SG, SD and SR, Canon and Kaga NLQ.

Details of further commands and printer compatibility are available from Seran at Redwood Publishing Ltd., 20-26 Brunswick Place, London N1 6DJ.

Trouble free screen dumps with UserDump for £19.95

VIEWCHART DISC



BBC/B/ B+/M/ C

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Present figures with ViewChart

The charts can be labelled and shaded to give a really professional appearance.

Epson-compatible screen dumps are included, one of which will produce a printout to the full width of an A4 sheet. Screen dumps for other printers can be painlessly installed.

The software is provided on a 5.25-inch 40-track disc (with 80-track converter). And the price of this professional package? Just £12.95.

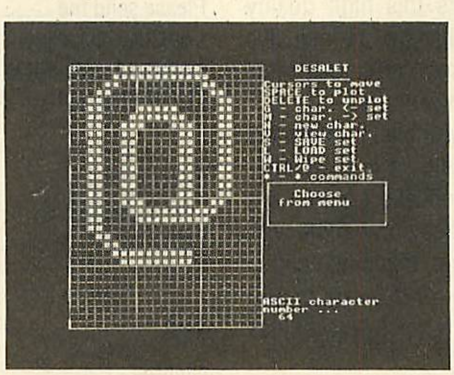
CALLIGRAPHY DISC

BBC/B/ B+/M/ C/E

Now you can produce professional tickets, letterheads and posters with the *Calligraphy* disc.

Desalet is a font creator which produces customised letters to your personal design and saves you using repetitive data statements and error-prone calculations. All font sets can be up to 94 characters long.

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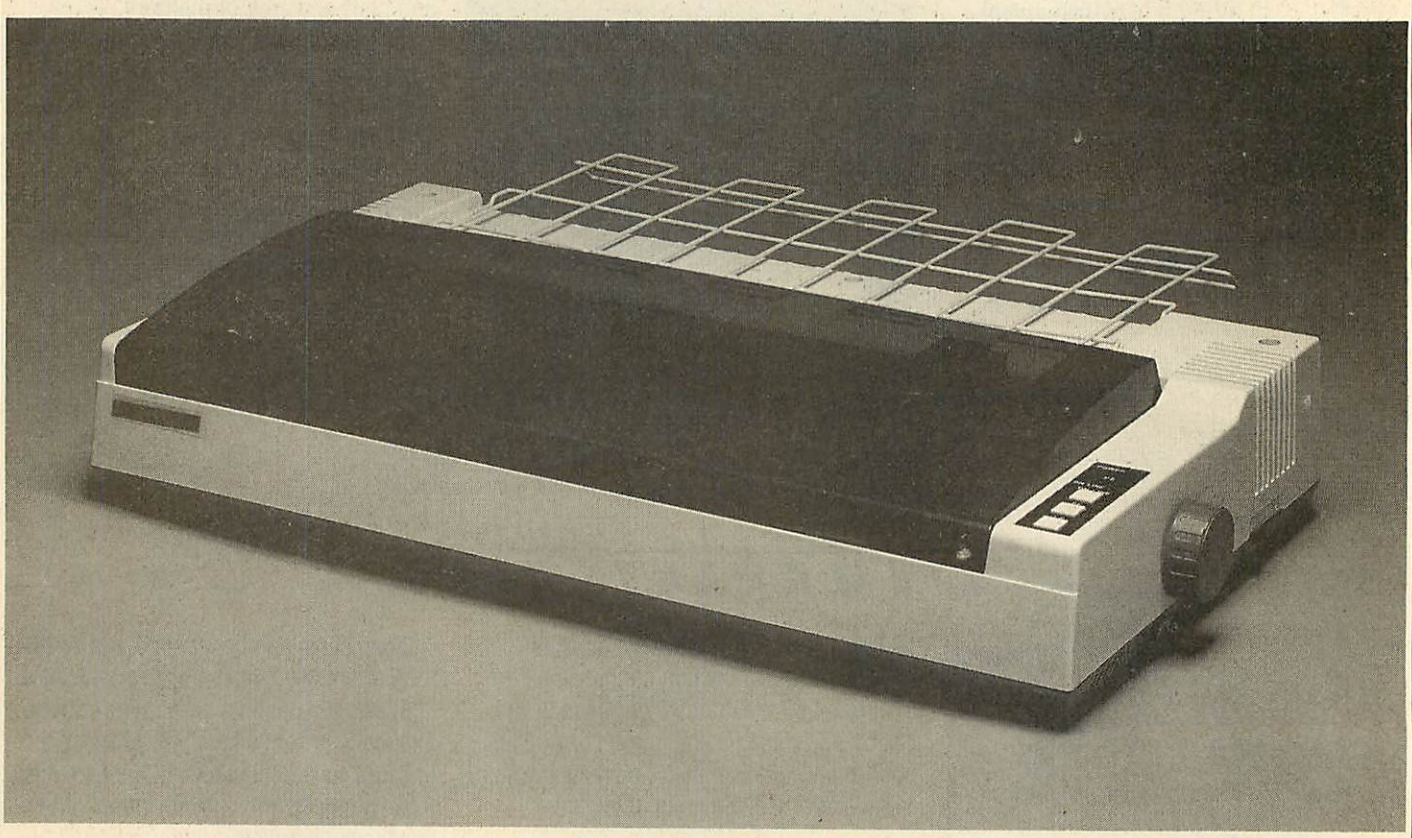
This superb disc comes on 40/80-track 5.25-inch disc and is only £9.95.

Design your own fonts with Calligraphy

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OFFERS

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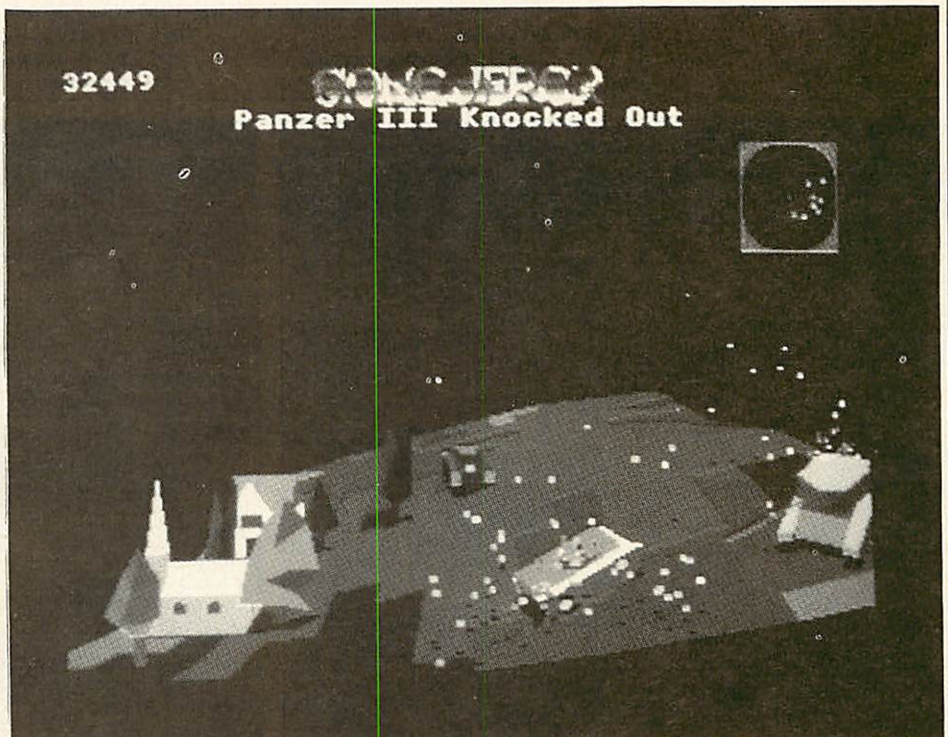
THE GAMES PAGE

ARMOURED ARC

We got our first look at the new Archimedes game *Conqueror* this month. Plus the latest news and hints from David Lawrence

Superior showed us three new games this month, though in truth they could only just wrest us away from playing Mirrorsoft's *Tetris*. One was the long-awaited Arc tank warfare game, *Conqueror*. The game gives you control of a tank, and you can drive across the *Zarch*-like landscape, flatten houses and leave ruts in all the fields, controlling the tank with vast numbers of keys – eight at the last count. Success in fighting off one tank is rewarded with a more powerful vehicle.

Sadly, the view of the landscape is horribly foreshortened, and the arcade element of the game is not all we hoped. But the multiple-tank options are more interesting, with some element of strategy being required to capture and defend a military objective, a village or hill top, for the necessary minute. The graphics look good, but Jonathan Griffiths has clearly borrowed from *Zarch*, and it doesn't have the instant appeal of David Braben's game.



A Panzer meets its match in *Conqueror*

The Jeremy Smith and Peter Irving game for the BBC micro we mentioned last month will be called *Exile*. Ah, that's why it's the next best to *Elite*, there's only one letter difference! It's an odd sort of arcade adventure set in space, with the objective being rescue of a marooned band of explorers. The graphics on this look detailed but a bit juddery when scrolling. Fun though, and with a few new ideas and puzzles to solve; pencil it in for May.

The third game is a bit of a puzzler. It's called *Pipeline*, and looks a bit familiar. Why? Well, it looks like *Ravenskull*. And which other game should look like *Ravenskull*, but *Guildmaster* from ASL, mentioned last month. What is going on here?

If you like a simple arcade adventure then Bug Byte's *Tutankahmun's Revenge* could be worth searching out. This sort of game is looking rather dated now, but it does have screen and game designers.

New in the budget market are *Pro Golf* and *Creepy Cave* from Atlantis, *Rik the Roadie* from Alternative Software and *Warehouse* and *Gridiron* from Top Ten. None of them are exactly the best thing since sliced silicon, but they are good value for money. Also, check out *Play it Again Sam 2* from Superior; *Repton 3*, *Crazee Ryder*, *Strykers Run 2* and *Galaforce* on one disc – can't be bad.

Two Godax releases have come to my attention. The first, *Cyboto*, is yet another top-view scrolling game, nothing new here. But the other, *Bolo*, is utterly different. Written by Delos Harriman, the author of *Skirmish*, it is a tank game which can be played by up to 16 people (on 16 BBCs) at once! You drive your tank around a huge playing area, attempting to destroy your fellow players' tanks.

Reader Jarod Nash has discovered how the animation on the Arc game *Zarch* looks so good. He found that if you play *Zarch* long enough to get in the highscore table, and when it asks you to enter your name, press Space-Home-Delete it scrolls the screen down slightly. If you continue doing this until the grey status bar disappears off the bottom of the screen and press Return, the highscore table will appear as usual, but when you play the screen will flicker terribly and you'll (just) be able to see it drawing all the shapes. What is happening is the 'other', shadow screen is being displayed. Normally this screen is updated while hidden to create the illusion of smooth movement. So now we know how its done!

Do you have any games news, opinions or hints you want to share with Acorn User *readers? Send games for review, cheats and letters to The Games Page,* Acorn User, *20-26 Brunswick Place, London N1 6DJ.*

REVIEWS

GAMES

BETTER LATE THAN NEVER



Winter Olympiad '88; Tynesoft; BBC, Electron; £9.95 (tape), £14.95 (disc)

It's off to Calgary with *Winter Olympiad '88*, the latest sports simulation release from Tynesoft. The game consists of six events from the Winter Olympics. These are the bob sled, speed skating, ski jump, giant slalom, ski slalom and the biathlon. There are three heats in each, the best score out of the three deciding which medal you get in each event.

The controls you use vary between events. In the bob sled you have two brakes, which you must use to prevent your sled from flipping over as it rises up the sides of the run. Three of the events involve continuously hitting two keys, one after the other, to obtain speed. In speed skating, this is the only thing you have to do, making it the most boring of the six.

The graphics are good enough to rival any I've seen on the Beeb. Trees half the height of the screen rush towards you in the blob sled. The three ski jump screens are 'hand' drawn and quite detailed.

Sound in the game is also very good. It's obvious that a lot of thought has been put into its design, for instance the cassette relay is switched to produce the sound of a rifle being cocked in the biathlon.

There are a few drawbacks with this game. The first is the most obvious; the hammering the keyboard receives. The second problem is that there is no test facility. Thus to practise the ski jump you must first go through the bob sled and at least one run of the speed skating.

My third grumble is that the Beeb locks up when Break is pressed, and since there is no built-in way of re-starting the game, the computer must be switched off.

Apart from these points, the game is good fun and really gets you in the spirit of the Winter Olympics – the only thing they haven't managed to simulate is the cold, and who needs it? **Gavin Gillings**

KOURT OUT

Kourtyard; Go-dax; BBC/Electron; £9.95 (cassette), £11.95 (disc)

In *Kourtyard* you play King Arthur as he tries to regain his royal treasures, including Excalibur, which have been stolen.

The game consists of four screens, one stolen item hidden on each. When this object has been found you progress on to a bonus level, and then on to the next screen.

You move about within a 7×7 section of a 64×64 playing area. When you reach the edge of the display, it is smoothly scrolled. Here lies one of the main problems with the game. Only half a sprite cell is displayed between you and the edge of the screen when it is scrolled, thus you get no warning of what you're about to walk into. I frequently found myself bumping into nasties before I could do anything about it.

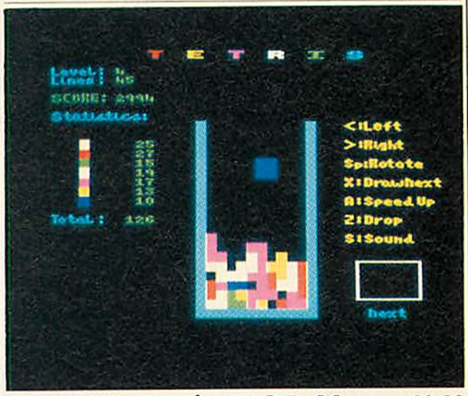
Objects encountered produce a variety of effects, such as reversed keys, a reduction of your energy, confiscation of your arrows or a change of screen colours. The latter sometimes sets all colours to black, just to make life a bit more difficult.

You constantly encounter soldiers who must be dealt with by means of your only weapon, a bow and arrow. Initially you have 75 arrows, but you soon find this is not enough, and luckily they can be replenished by picking up extra quivers.

An editor is supplied with the game. This allows you to design screens, but does not let you change the graphics. In fact to get any graphics at all you must load in one of the pre-designed screens and then draw over the top of the maps.

When I first played *Kourtyard*, I was not impressed. The first screen seemed very mundane, with nothing much to do apart from walk and fire, and very little sound to liven things up. It improves on later screens, however, with the introduction of more interesting objects. Pleasant to play, but nothing new. **Gavin Gillings**

AFTER GLASNOST



Tetris; Mirrorsoft; BBC B, Master; £8.99 (tape), £12.99 (disc)

After several somewhat disappointing games Mirrorsoft's latest release is a breath of fresh air. The game is *Tetris* – apparently designed in Russia (the reason for the picture of the St Basil's Cathedral on the box), and it combines absolute simplicity with total addiction.

The idea of the game is to manouvre coloured shapes into as tightly-fitting a mass as possible. Each shape is based on an arrangement of four little squares. When the game begins, you are presented with a box-shaped area into which the shapes fall. By moving the shapes left and right, and by rotating where necessary, successive layers of squares are built up. If you manage to form a complete line of squares across the playing area, the whole block of squares drops down by one and you are awarded extra points. Blocks fall at a varying speed depending on the current skill level. More points can be scored if blocks are forcibly dropped into place.

As the game progresses, things start speeding up and you soon find yourself pressing all keys possible in total panic. By the time the blocks reach the top of the playing area, you need lightning reactions to maintain control.

There is no sound to speak of, the graphics are crude but effective and there are few 'frills' – no pause key for example. But there is something about *Tetris* which makes it impossible to put away, it keeps me up till the small hours every time. It's the best game for the Beeb in ages. I can guarantee that after a few minutes with *Tetris* you'll be hooked. **Rob Miller**

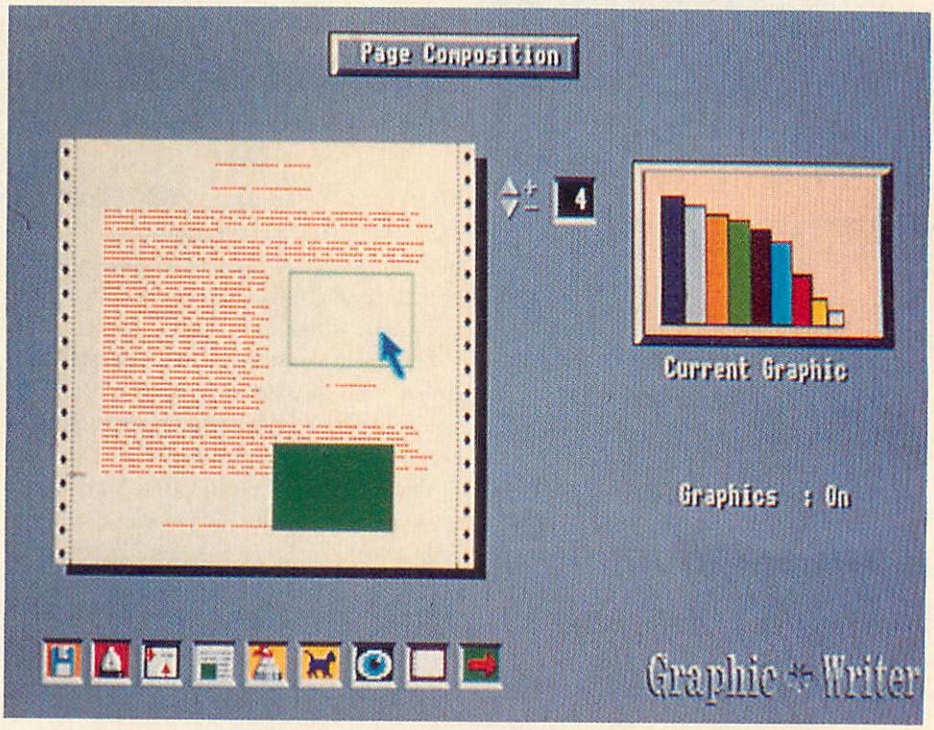
SOFTWARE

ALRIGHT OR ALL WRONG

Bruce Smith is disappointed by the first Arc wordprocessors – *ArcWriter* and *Graphic Writer*

However good the hardware, the success of any computer is determined by its software. New software making good use of the speed and graphics is vitally important for the Archimedes, and software development takes time. Like Graham Bell (see the March editorial) I was amazed that Acorn did not bundle the *View* family on the Archimedes Welcome disc. It claimed this was to encourage the development of 32-bit software. Running eight-bit BBC software such as *View* under the 6502 emulator is not what the Archimedes should be used for, but at least it would provide some excellent applications for users to be getting on with while waiting for 'proper' Arc software.

For wordprocessors, the wait is supposed to be over. But the first batch of Archimedes software is disappointing. The Archimedes is the world's fastest micro: Acorn and Clares have used this to allow them to write their wordprocessors in BCPL or Basic, when you would expect them to use the machine's native language, ARM machine code.



Placing a graph onto *Graphic Writer*'s neat page layout screen

Graphic Writer

Graphic Writer's visual presentation is like *Artisan*, and the overall effect is both pleasing and stylish. In addition to the wordprocessor, a useable graphics editor is included. Graphics may be incorporated directly into your document.

On booting the disc a document called 'Default' is loaded – an excellent idea. This document could be your standard setup file. The screen is simple and un-cluttered. Clicking the middle button on the mouse brings up a small icon box, through which the full range of features are accessed. Some of the icons are a little cryptic, but with use they become familiar. The menus have the annoying habit of disappearing as soon as you move the pointer away – I found it infuriating. It is easier to cope with menus that stay put until you do something else. Annoyingly, the icons react differently to pressing the different mouse buttons.

The wordprocessor allows you to use all the normal range of effects – underline, bold, italic and so forth. But, these are not displayed on-screen in edit mode – only the standard 8×8 font is used. Text in italic or bold is shown by blue markers. A fully WYSIWYG preview option is an icon click away, where all the effects can be seen. In addition, a mini-preview facility shows a whole page on screen. The text appears 'greeked' – unreadably small – but the page layout including headers and footers and any graphics can be clearly seen.

Text formatting is handled very neatly through menus, as is the search and replace option. Most importantly – it's simple. Tab stops and margins are easy to adjust. Many commands are available from function keys as well as the menu system, but there's no key strip.

Up to 16 documents can be open at any one time. You can cut and paste text between documents if you wish. Moving between documents is really simple – bring up the correct menu and click on the required document in the list displayed. There is an unnecessarily small maximum limit of 32k for a text file. Even *View* can manage more than this. But longer texts can be dealt with using a multiple document mode. This system, akin to that found in *InterWord* though rather more sophisticated, consists of a control file called a 'master'. This is constructed through the menus and contains details of all the text files, graphics and page composition details making up the document.

The page composition menu is delightful and rather than my trying to describe it, simply have a look at it illustrated in the screen shot.

The graphics editor offers a good range of facilities and uses the full range of colours and effects offered by the Archimedes operating system.

You can have up to 64 graphics in any one document. Inserting a graphic is quite easy, once you've guessed how to do it from the vague clues the manual gives. The image itself can be placed and moved on the page, and may be scaled to a suitable size. The surrounding text won't re-flow around a graphic dropped into the body of

it – something I would expect to see. You have to adjust rulers to keep the text away from the graphics.

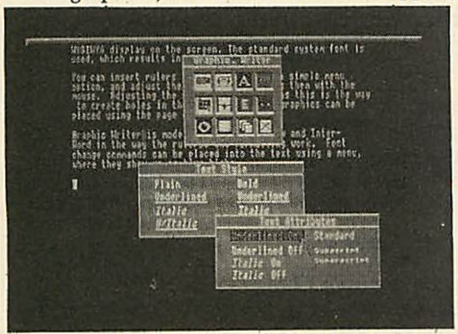
The ability to handle graphics means that you can design small logos and the like, and include them as part of your letterhead for example.

A Basic utility is also provided to allow the printer driver to be customised to your own requirements should you have either a non-standard printer or wish to modify one of the standard drivers to produce some special effect.

ArcWriter

Everybody who has returned their Archimedes' registration card should have received a free copy of *ArcWriter*. Its on-screen presentation is quite pleasing. A menu bar sits across the base of the screen with tasteful icons. The main portion of the screen contains the text entry window. The font used is a Courier-like typewriter font in either pica or elite pitch. The screen displays excactly what will appear on paper. The range of effects is adequate, though hardly exciting. Underlined, bold, enlarged, super and subscript text are displayed on screen, but the range is limited to that found on the common dot-matrix printers. The anti-aliased fonts appear to be blurred and smudged at the edges. For use on a working display, clarity is more vital than exact size.

Using these special effects is very slow. Having spent just a few moments tapping

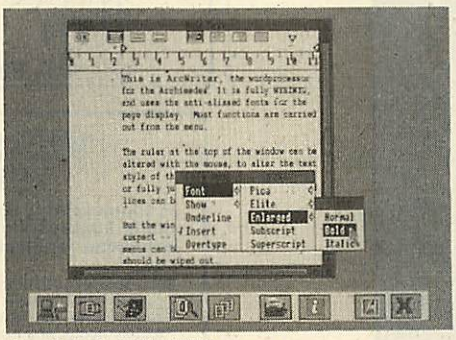


***Graphic Writer*'s style is controlled by menus**

text in, it took several seconds for the display to catch up. The characters can almost be seen appearing one by one. Each effect requires a different version of the font, and these are cached in the Arc's memory. But on a 305 this can make *ArcWriter* virtually unusable, as it needs to re-load the fonts every time it changes to a different effect.

Font changes are applied via a menu or the function keys. Typing text in, you select, say, italics, then type a section, then reselect your normal style. Alternatively, the style of a section can be changed by highlighting a block of text, and selecting the new style from another menu.

The Search and Replace options are fast. But the searching is case sensitive – 'A' is different from 'a' – so you have to be careful about your use of capital and small letters. You can't search and replace font changes, so you can't change all italics to underlined for instance.



***ArcWriter*'s WYSIWYG screen**

The size of the text window can be changed but often you can't put it back. The block operations of copy, move and delete, function smoothly. Defining headers and footers is simple enough – just click on an icon, then enter the text into the box thrown up on-screen.

As with *View* and *InterWord*, *ArcWriter* sports a ruler, and icons on it can be clicked to choose text width, line spacing, justification, tabs and indents. Spacing is limited to single, one and a half and double line spacing – rather restrictive.

In effect, each line of text is controlled by its own ruler. This is a nice, simple system, but there's a problem: changing the style of the text after you've typed it in. To justify an unjustified document, you highlight the whole document as a block, then select the 'justified' icon and 'ok' on the ruler. But this applies that new ruler to every line – any indents, tabs and line spacing variations are lost too. This is shocking: changing the ruler on blocks of text should alter only one aspect of the ruler at a time; spacing, indents, tabs or justification, not all of them at once. This lack of thought shows in other areas. Many typists use two spaces after a full stop. In *ArcWriter* you can't do this, because if the full stop falls at the end of a line, then the second space indents the beginning of the next line. And again, some of the icons select only with the left mouse button, while others require the middle one.

Acorn have kept with their traditional approach, using a special driver to handle printer control. Several pre-defined drivers are supplied, catering for the popular Epson-compatible printers. Different drivers are supplied for FX, LX and LQ printers, in both draft and NLQ modes. A printer driver generating program is included on the disc too, and thankfully this is relatively easy to use – provided you can understand your printer manual of course!

In conclusion

Both packs lack a spelling checker and thesaurus. These are as fundamental to major wordprocessors as search and replace, and are major omissions. In fact they both offer very little more than a standard Beeb wordprocessor.

I'm hardly over the moon about *ArcWriter*, in fact I'm appalled that Acorn would wish such a product on their supporters. It is totally bug-ridden – the number of times it left remnants of menus on the screen instead of redrawing the text window properly is unbelievable – and it has obviously not been properly tested before its release.

I wouldn't trust it with a letter. A new version is rumoured to be on the way, but I'd avoid it totally. On a scale of one to 10, it gets zero. It beats *Graphic Writer* in one area only – its manual.

Despite being written in Basic, the *Graphic Writer* wordprocessor looks a much more professional tool than *ArcWriter* but the 63-page manual is abysmal. It took me several frustrating hours to fully comprehend how what the manual says relates to the screen. In particular, finding my way around the menus was a chore, because of the cryptic icons used.

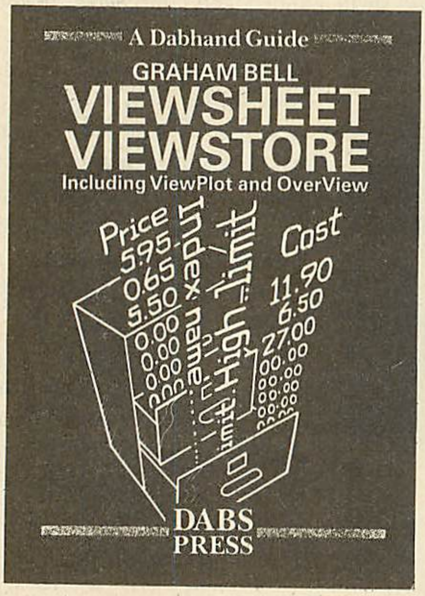
Putting *Graphic Writer* and *ArcWriter* into perspective is difficult. On one hand, they should be compared with the well-known packages for the Mac, or wordprocessors running on the IBM PC. Neither measure up to this standard. But the price of *Graphic Writer* is around a tenth of the price of this type of software.

Perhaps more appropriate is comparison with existing BBC micro packages. *Graphic Writer* offers as much as *InterWord*, with the added bonus of simpler page layout control and the ability to include graphics. And it's also cheaper – at £29.95 it is very good value. *ArcWriter* can best be seen as an integral part of the machine – as all existing owners should receive a free copy. All that can be said is that *View* on the Master and Compact provides you with a better wordprocessor.

Graphic Writer *From Glares Micro Supplies, 98 Middlewich Road, Northwich, Cheshire CW9 7DA. Tel: (0606) 48511.*

OFFERS

HANDBOOK OFFER



The ultimate guide to using ViewSheet and ViewStore

This latest Dabhand Guide is the ultimate tutorial and reference work for users of *ViewSheet* and *ViewStore*.

Written by *Acorn User's* editor Graham Bell to appeal to beginner and experienced user alike, it describes in detail how to set up, use and maintain spreadsheets and databases, providing comprehensive and practical examples throughout.

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EDUCATION

NEWS

Humanities stressed by MESU workshops

MESU is increasing its humanities work with a number of projects and in-service sessions over the next six months. There will be a lecture and workshops on *Learning Geography with Computers* at the Geographical Association Conference, April 6-8, at the London School of Economics. At the International Conference on Computers in the History Classroom at Leeds University July 5-8 there will be workshops; *Digging deeper into History,* followed by *MESU and Development Work in History.*

MESU has also produced a supplement to the New History and New Technology document produced by the Historical Association. It provides an update on computer software and other initiatives and ideas in the humanities.

Further information from Paula Kingston at MESU.

News in brief

■ Micro Studio has prepared a series of clip art dics for use with future Archimedes desktop publishing packages. The digitised pictures can also be imported into *Artisan*. They are a resource for creating a broadsheet or advertising circular but are suitable for general education use.

Micro Studio already produces materials for use with AMX Stop Press and Mirrorsoft's Fleet Street editor.

■ Linear Graphics' A3M plotters will interface directly to the Archimedes with an appropriate Centronics lead. This, and an Archimedes Welcome disc and manual are available for £32.00. Plotters without the 'm' suffix will require the upgrade kit at £165.

A range of custom-designed software has also been prepared, which includes the popular Linsign, Linfont and Lintrack. The first now offers a range of fonts and utilities to meet signwriting needs.

Sherston adventures

Sherston Software has released two adventure packages. *Teacher's Cupboard* is a very simple infant/reception adventure designed to introduce the computer and provide some simple problem-solving.

Children are encouraged in the adventure's two parts to bring the teacher an apple and a crown. With the help of a mouse and a giant the apple is found. Both parts may be operated with either a concept keyboard, or with the space bar and function keys. Attractive graphics continue Sherston's commitment to presentation.

Worst Witch, based on Jill Murphy's popular book, is a more conventional adventure game intended for the middle school. The pupils explore the Witches' Academy and encounter many of the problems first seen in the book.

EDUCATION OPINION

Eight million pounds of the Government's £19m Education Support Grant is being spent on hardware for schools. This should be appearing in schools in the next few weeks, often in the form of desktop publishing or CAD systems.

Advisers have been guided by the government document *IT in Schools.* Micros should employ the latest technology and keep up with technological innovation. Acorn is heavily promoting the Archimedes as possessing these qualities.

Another prerequisite is that machines should be capable of running IBM-type software. With its 32-bit technology and PC-emulator, the Arc outstrips its RML counterpart. Although other machines fall within the brief, it is likely that authorities will accept an Archimedes on trial before making final decisions for the future.

Nick Evans

EDUCATION CONTENTS

ARCHIMEDES LOGO

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DALES BREWERY, GWYDIR STREET, CAMBRIDGE, CB1 2LJ, TEL: (0223) 323656

Children's dictionary out on floppy disc

Viewbook has produced the Oxford Children's Dictionary on disc using its information retrieval system. This is similar to the *Hypercard* idea, which allows a number of points on a record card to be 'live' – that is, linked to other cards. Users may follow any path through the information stack.

The set comes on two double-sided 80-track discs or five 40-track discs, and allows children not only to locate their word by spelling or definition, but also to move around the dictionary through words which appear in the definitions themselves. Wildcard searching, fuzzy-matching and a guessing game are available.

Additional options include speech synthesis, single and dual switch control and a Perkins Brailler interface.

Viewbook also produces an authoring system for creating your own interactive database.

Extra Pendown features

Logotron has added a series of extra utilities called Extra 1 & 2 to the *Pendown* wordprocessor suite. Utilities include a double-strike option allowing darker printing and the ability to merge characters from different fonts into one font file. Eight new character fonts include Infant, for the infant classroom. Two graphics fonts include animals and insects.

The adventure generator is demonstrated with a dictionary and help files relate specifically to projects on pondlife and the Romans.

Logotron has collected much of this additional material from existing users.

News in brief

■ *Labelwriter* from Wight Scientific is a powerful but cheap utility for producing labels in a variety of shapes and sizes. Centred text of all the varieties available on an Epson-style printer is allowed, and graphic images imported from *Signwriter* can be used. Serial numbers can also be included.

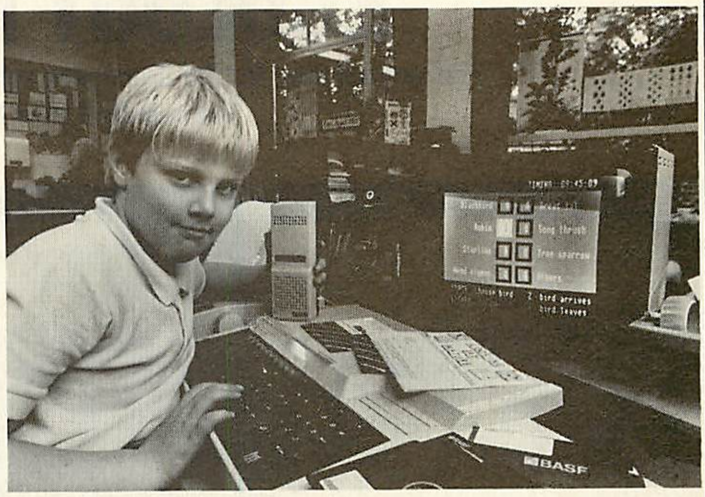
The BBC version of *Labelwriter* costs £10.

■ A datafile of educational software and addresses is now available for the Archimedes, using the *System Delta Plus* database management system from Minerva. Enquiries should be sent to Nick Evans, PO Box 55, Grimsby, Humberside DN32 0QB.

Contacts

MESU, Science Park, University of Warwick, Coventry CV4 7EZ. Tel: (0203) 416994.
Sherston Software, Swan Barton, Malmesbury SN16 0LH. Tel: (0666) 840433.
Micro Studio, 83 Clay Streer, Soham, Ely CB7 5HL. Tel: (0353) 721736.
Linear Graphics, 28 Purdeys Way, Rochford SS4 1NE. Tel: (0702) 541663.
Logotron, Dales Brewery, Gwydir Street, Cambridge, CB1 2LJ. Tel: (0223) 323656.
Wight Scientific, 44 Roan Street, London SE10 9JT. Tel: 01-858 2699.
BBC Soft, Woodlands, 80 Wood Lane, W12 0TT. Tel: 01-576 0202.
Viewbook, Freepost, Bedford Street, Stoke on Trent, ST1 4BR. Tel: (0782) 281643.

■ The Education News pages are compiled by Nick Evans



Strictly for the birds

Bird Spy is a specialist database program based on the BBC Radio 4 series *Looking at Nature*. It enables the class to watch and record the times up to eight species of birds land and depart from a bird-table. *Bird Spy*, which costs £14.95, is designed to make the use of databases easy in the classroom.

BBC TV's *Blue Peter* recently featured the software. The fourth year juniors of Bentworth Primary School, who operate the *Blue Peter* Bird Patrol, were given Bird Spy. *Mike Powell, headmaster of the school, runs a Young Ornothologists Club and took the children for birdwatching sessions.*



Paul and Joanne using Bird Spy

COMPETITION

This month's competition is gives young birdwatchers the chance to win *Bird Spy*.

We have six copies to give away, three each for under 12s and over 12s. To enter, just answer the questions which apply to you, and send them on a postcard to: May Competition, *Acorn User*, 20–26 Brunswick Place, London N1 6DJ. Include and your name, age and address on your card. Entries should be in by May 20.

Under 12s questions:

■ Which is the smallest British bird?

■ Do barn owls hoot?

■ Where do puffins nest?

Over 12's questions:

■ What does the pigeon belong to, the duck family, the seabird family or the birds of prey?

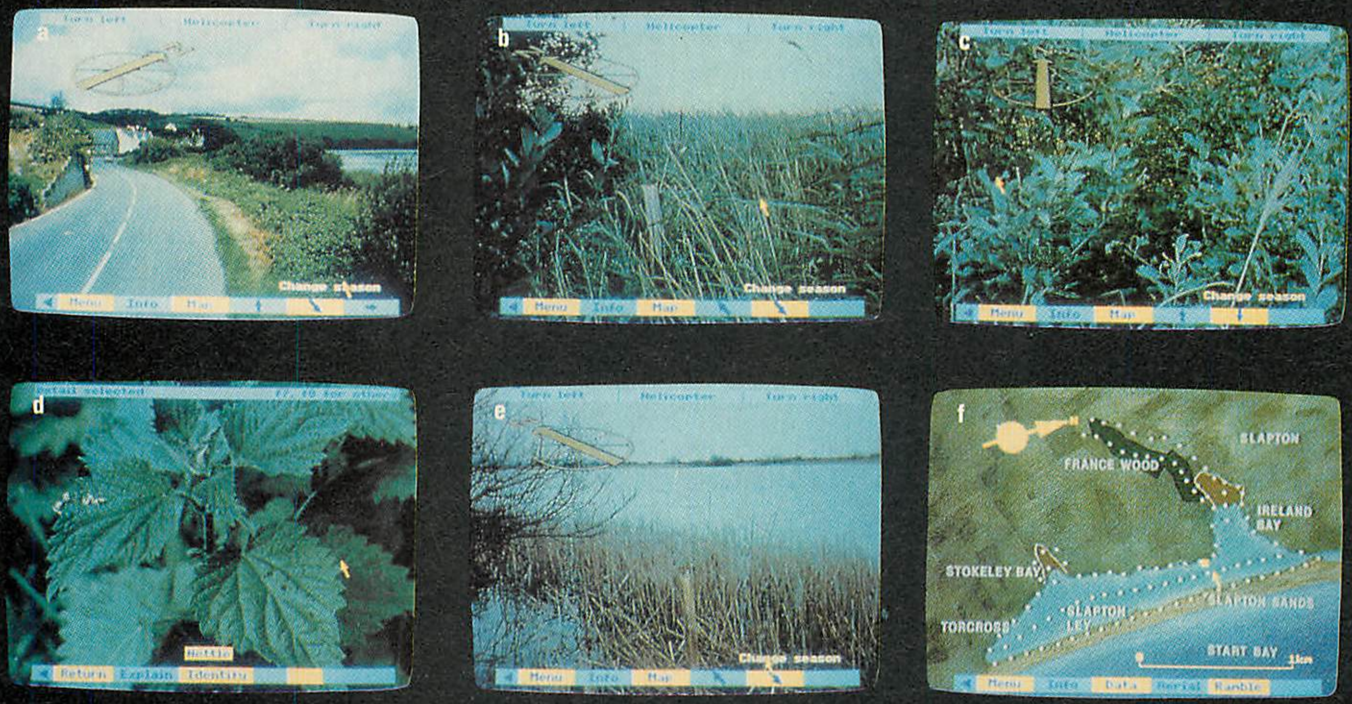
■ In which British country, England, Wales or Scotland, do red kites live all year?

■ Which common bird of prey hovers when hunting?

SOFTWARE

ECOLOGY EXPLAINED

The second disc for the Domesday system simulates a Devon nature reserve. Graham Bell tries his hand as warden



Take a stroll around Slapton Lea up the road to the reed swamp (a). You can turn around (b) or take a more detailed look at the vegetation (c), even view the same scene in winter (d). And the map stops you getting lost (e)

The *Ecodisc* is a simulated world. It's a world based on the real Slapton Lea nature reserve in Devon. Using it, anyone can do many of the things that professional biologists and students do on fieldwork, and learn many of the same lessons, without ever leaving the classroom.

BBC Enterprises *Ecodisc* is the latest example of interactive video, a system where pictures are played back under computer control. The video pictures can be overlaid with computer graphics and text. Given the right software, you can control what happens next on the screen.

The *Ecodisc* is only the second package of software for the Acorn Advanced Interactive Video system. Sales of the system have been disappointing so far. The hardware is expensive and the quality of the information on the Domesday discs is variable. £5200 for the Philips VP415 Laservision player, a modified Master 128 Turbo and Trackerball is a great deal of money, and fewer than 2000 have been sold. But the voucher scheme for schools, bringing the price down to £3000, has been extended until the end of the year.

AIV discs are like giant-size versions of the compact discs familiar to music fans. The main difference is that they can store video information – moving or still pictures – or computer programs and data, as well as stereo sound. All the software for the *Ecodisc* is on the disc itself.

On one side of the disc is a TV programme from the BBC's *Science Topics* series. Switch on the Laservision player, insert the disc and sit back. There's no need for the computer at this stage. The programme describes the Slapton Lea nature reserve and introduces some of the problems of landscape management. This is done via a series of interviews with fishermen, local farmers and biologists studying the flora and fauna of the area.

In particular, they stress four major concerns. Slapton Lea is a narrow lake in a 'bay', cut off from the sea by a long sand bar. The lake once provided excellent fishing, but the quality of the sport provided by pike has declined recently. Second, the reed beds fringing the lake are quite naturally becoming drier and overgrown with willow bushes. This reduces the variety of plants and birds in the reserve. Third, the extensive oak woodland surrounding the lea will soon be predominantly sycamore, a tree introduced into Britain only a few hundred years ago. Fourth, any increase in human activity around the lea is bound to disturb the local population of otters, an extemely rare animal in the south of England. As one expert says in the film, you can't go back to the situation of 20 years ago – management of the area should aim to limit the impact of change.

It's certainly an informative programme, but this part of the video disc could just as

well be on video tape; it's just a normal TV programme, with no interaction. But watching it provides vital background information for the real content of the *Ecodisc*, on the other side.

To run the interactive side of the disc press Shift-Q-Break just like the Domesday disc. After an opening sequence taken from the *Science Topics* programme, you are presented with a five-item menu.

the different parts of the reserve, woodland, reed beds, lake shore and so on. You can save any tour of your own onto floppy disc and replay it later.

Another of the options that you might like to use is Watch. This gives you the ability to find out what experts expect to happen over the next 50 years in various parts of the reserve, providing no drastic management action is taken. This allows

hide in. Then a series of film clips is presented, giving you glimpses of birds or snatches of song. You can tick each one off by pointing to a list – click a button on the Trackerball and the totals mount up. Identification is helped by a 'help' menu. Clicking on the menu bar leads you to an 'identification of birds by photograph' option. You can flick through the photos until you find what you're looking for.



You can set up cameras (a) to get photographs of hard-to-find animals (b), then trail them through the day by radio (c). Identifying trees (d) shows that the woods are not all the same (e). At the end you have to come up with a plan (f)

To get some idea of the environment of Slapton Lea, you should definitely take a ramble around the reserve. You wander around by moving the Trackerball pointer to direction arrows at the foot of the screen and pressing a button. Each press takes you 100 metres in the chosen direction. From any point you can survey the whole scene by turning round, and you can take a closer look at some of the plants growing around you. You can even 'row' up the lake, or take an aerial look at the spot from a helicopter. If you get lost, you can swap to a map view which shows where you have walked to. You can also go directly to any point on the reserve, simply by picking out the new spot on the map. The most impressive aspect though, is the 'change season' option, which reveals the marked difference in the landscape between summer and winter. This is most startling in the reed bed areas and along the lake shore.

An extra option allows a guided tour of you to find out the nature of natural changes in the fauna and flora of the reserve. For example you should notice that the current trend of the competition in the woodland areas is expected to continue, until sycamore almost completely replaces the oak. In contrast, changes in the lea are cyclic. Currently, the number and size of the pike is decreasing, but like many predator/prey systems, the smaller fish that the pike live on will increase as a consequence. So the pike population will eventually benefit from a greater food supply, and their size and number is expected to recover. This is a good topic for classroom discussion in biology.

Sampling the animals and plants of the area to learn about their numbers and habits would obviously be of great benefit before making any plans for the future.

Perhaps the simplest option is bird-spotting. You can choose from a map what area of the reserve you want to set up your

Of course, different parts of the reserve yield different mixtures of birds. Swans live around the lake, woodpeckers tend to stick to the woodland. Mapping the occurrence of different species by repeated watching at different spots makes the idea of habitat crystal clear. Interestingly, while bird spotting there is no indication if you identify a bird wrongly – the only way of checking is to match your habitat map against that provided by the system. But this deliberately reflects the reality of fieldwork – you don't get told when you make a mistake.

Another sampling method that you can simulate is quadrat counting. This is aimed at studying the mix of tree species in an area of woodland called France Wood. Essentially, you mark out square areas of the wood and identify all the trees growing in the square. Once you have all your quadrats counted, the results can be displayed on a graph. A sensible transect of the wood shows how the mix of species

varies – mostly oak in one area, but dominated by sycamore in others. The nature of the ground flora can also be mapped, and your results can be compared with 'correct' counts for your quadrats.

The most complex sampling exercise, and perhaps the most exciting, is studying the mammals. The reserve is an important site for mammals, one of the few areas in the south of England boasting a significant population of otters. The mammals can be studied by trapping or photography. A map allows traps or cameras to be placed anywhere on the reserve. The cameras are the sort that automatically take a picture whenever a light beam is broken – so there's no one there to disturb the animals – a commonly used technique. The pictures can be displayed, and there's also a graph showing when each camera 'fired'. Again, animals caught by the cameras have to be identified: badgers, foxes and mink are all common, as well as the otters.

Animals caught in a trap can be fitted with a collar containing a radio transmitter, released, and tracked with direction-finding equipment. The software allows you to do this, and by following the path of a badger, fox or otter over a day, a great deal can be learned about the animal's habitsand territories.

The fieldwork section of the *Ecodisc* is very strong. It's no replacement for real fieldwork, but it could help teachers give their students experience.

The main section of the *Ecodisc* is the Plan section – developing a strategy to manage the reserve for the next 10 years.

You can learn a lot about your job as nature reserve warden by visiting your office. Here is your desk, with a micro, your mail, answering machine and the local papers. Each can be pointed at with the Trackerball. Reading the job description gives you important priorities for the reserve – maintaining the diversity of plants and animals, and increasing the amenity and financial value of the reserve. Listening to the phone messages from interested locals, and reading the papers and letters gives some idea of the pressures that different groups are placing on the reserve. Trippers and the tourist authority want more car parks and picnic sites, the woodland authority want to turn the wood into a conifer plantation, and the local eel poacher just wants to make a living!

Once you are aware of the pressures, then using your knowledge of the reserve gained in earlier sections, your objectives furnished by the job description and your own feelings about conservation, you formulate a management plan. There are a host of actions – ranging from harvesting the reeds for thatch and encouraging picnicers, to culling the pike in the lake and felling the sycamores. But you can only choose two. Choosing what to do means choosing between the various interests.

A plan can be submitted for comments – and you'll get them. Each plan elicits a different set of letters, phone calls and comments from the interested parties. You'll be told what is likely to happen to the value of the reserve and to its plants and animals, and you'll have the chance to amend your plan. Don't be worried if everyone seems aghast – nature reserve wardens don't make many friends, because their plans can't please everyone. Finally, your plan can be executed, and here is where the *Ecodisc* is weakest. All you get is a list of the reactions of various different groups. The system tells you who is pleased and who is disappointed, but nothing more. I, and many teachers, would like to see something analogous to the Watch option, where the expected changes are modified in the light of your planned actions. This would give a stronger end-point to the work, where the planning phase may mark the culmination of the project. But working with the *Ecodisc* does underline the fact that there's no right answer in the conservation business: it's very reliant on trial and error, and the lack of an identifiable end is deliberate.

Everyone is in favour of 'conservation' as an abstract concept, but the hard question to answer is 'Who or what is it for?'. This sort of issue is a wider topic than the original concerns of the disc, and deserves serious classroom discussion with older school or college students. Some extra support materials for teachers would be a big advantage here. Certainly Peter Bratt, the BBC producer responsible for the disc is aware of the need, and the *Countryside* disc due late this year will have such support materials available.

The Ecodisc *is available from BBC Enterprises, 80 Wood Lane, London W12 OTT.*

A CHEAPER ALTERNATIVE

If you don't have £5000 to spend on a Domesday system, you can still practise some of the sampling and planning exercises. BBC Soft's *Ecology and Conservation* pack, a *Science Topics* software title, is very similar in conception.

The fictitious nature reserve is again a wetland with reedbeds, encroaching willow carr and a population of pike and otters.

The watch section presents an animated history of the reserve, showing the gradual building of reed beds out from the lake shore. As the beds extend, they are invaded by young willow, and the lake vegetation follows its natural succession. At any stage, you can halt the succession and find out more about the bird life, the otters or the fish population, and so gain an impression of the consequences for the animals of changes in the plants.

Sampling allows you to find out how many pike, otters or birds there are in the reserve. Otter territoriality can be studied by identifying coloured otter tracks. The variations in vegetation across the reserve can be studied by counting icons representing different plants in quadrats.

Like the *Ecodisc*, you can develop a management strategy for the reserve. But this is presented more like a game, with points won for improving the environment. While you aim to optimise the reserve for one particular interest group, the effects of your chosen actions on other groups can be gauged, and you lose points if they complain. So a keen birdwatcher may wish to reduce tree growth to encourage reed bed-dwelling birds. This also affects the naturalists, fishermen and reed growers, and as with the *Ecodisc* their reactions are weighted against any success in helping the birds. However, the package wins over the *Ecodisc*, in that the outcome of your plan is estimated and displayed.

Choosing options and actions is more difficult than the *Ecodisc*, because combinations of keys sometimes need to be used, rather than simply picking from a menu. The presentation is less impressive – but it's a sound introduction to the problems of conservation.

***Ecology and Conservation*, £23 from BBC Soft, 80 Wood Lane, London.**

OFFERS

DTP OFFER



Desktop publishing made easy

Typesetter is a full desktop publishing package that is easy enough for junior children to use and yet it is sophisticated enough for the majority of applications.

Produce your own newspaper, design notices, work cards and tickets with *Typesetter* from as little as £27.50.

'A remarkable desktop publishing package, simple but powerful, and a bargain.' *Educational Computing*, April 1987.

Fleet Street Phantom is an excellent adventure program that introduces children to the world of Fleet Street. Children have to find the Phantom at the offices of the *Daily News* and in doing so they have to undo his misdeeds to save the paper. The reward is becoming the editor. This program is a great way to teach children high order reading skills as they battle their way from junior reporter to editor. The price is just £16.

Both the above packages work with the BBC B, B+, Master 128 and Master Compact. *Typesetter* is also available for Econet networks.

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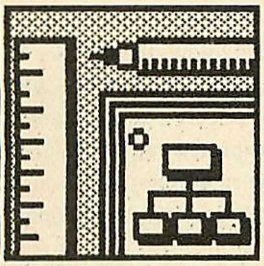
SOFTWARE

EDUCATIONAL DATABASES

David Marshal surveys six of the simple databases which are aimed at the schools market

Computers are really good at storing huge amounts of information. The ability to store information is of little use in itself. It is the speed at which a computer can sort, sift and display data that makes it such a boon. Most areas of the school curriculum require students to accumulate information. Teachers are constantly asking them to make notes, or find out about some aspect of their environment. The use of an electronic database makes it all so much more accessible. Some 'jargon' terms like file, field and record for example, are daunting, but all good databases also have the command HELP in their vocabulary. It is worth bearing in mind that if a school keeps data about people, then the school should register under the Data Protection Act, usually via the LEA.

Any part of the curriculum can be enhanced by the use of a database. Census data can bring history alive for example.



There are three very distinct activities in the use of a data file. Each is a good exercise in itself.

First, you must collect the data. The information has to be in a form that is compatible with the database manager program that you are using. I remember trying, with a number of young children, to convince a very inflexible database system that as far as shoes are concerned, 13 is smaller than 1! Because of problems like this, questionnaires have to be compiled with great care. If all the answers you collect are of the yes/no type then the data file is going to be really boring when it is searched. If the answers are too wide-reaching then the screen display is going to be incomprehensible – or just too big.

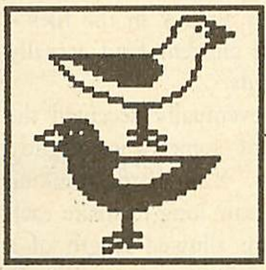
You should have some idea of the way you want to use the information, the sort of searching and comparing you want to do when the file is complete. It's no good to know exactly how many children have green eyes or pets, if you are really interested in how they get to school and what books they read! This planning phase can be very interesting and productive. Teachers should resist the temptation to tell students the types of data they should collect. Let them decide for themselves. The actual task of researching, eliminating, organising and thus creating a data file gives students a greater knowledge of the subject they are considering.

The second phase of any work is actually putting the information into the system. There are a number of different database managers aimed at school use. How easy it is to input data varies considerably from one to another.

Third comes the really exciting and useful bit, the searching of the file when completed. No one thinks automatically in a systematic, linear way. Using a database can train thinking to become more reasoned and less random. It can also allow for lateral thinking – 'what if?' queries are answered at speed. Disparate pieces of information can be identified and related in a way that is impossible, or at least impractical, without a computer. Questioning skills develop very quickly, and testing of hypotheses becomes commonplace. It is a lot easier for students to get the answers if they know how to form the questions.

It is important not to collect information just for the sake of putting it into the micro. The use of a database *might* be a useful abstract exercise, but the lesson will be learnt far better if the data has a purpose.

A recent project that many children in my area have been involved in has been concerned with the local environment. One aspect was the number and type of birds observed in and around the school. I decided to look at a number of different database management systems to see how easily they were to use for this data file. Two points were acknowledged before I began. First, the most popular database for very young primary children has been *Ourfacts* – formerly called *Ourselves* – that was part of the *Infant Pack* released by the MEP's Primary Project team. It is very simple, very restricted, but a very good introduction to the idea of collecting and sorting information. but it is too small for the bird files. Following the principles of *Factfile*, supplied with all DTI micros, this simple system has a useful place in the infant classroom. Thanks to later, upgraded, versions it is now possible to make printed copies of *Factfile* files – essential for all database work. Some of the simple early systems failed to acknowledge this need. But the very simple data collection program *My Mathematical Self* in the Dudley Software package *Myself* has recently gained a new lease of life in my school. It used to be impossible to get a printout of the records collected. Now thanks to the ESM *Screenprint* ROM, we can. While this program is still limited with the screen dump, without it is useful only as a lesson in how to enter data. The second point to note is the place of *Quest*, the forerunner to most other school database systems. It is, however, a little dated, and is less friendly than most systems.



I have considered six databases: *Find* and *Junior Find* from Resource, *Grass* from Newman College, *Inform Plus* from Nottingham County Council, *Supastore* from ESM and *Key* from ITV and GSN.

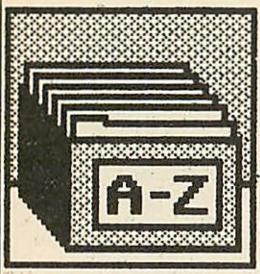
When setting up a database the first thing to be considered is the number of 'fields' required. Fields are the headings under which the data will later be collected and searched. For the birds file these field names were chosen: Name, Colour, Feet, No of eggs, Colour of eggs, Voice, Nesting place, Rare, Food, Family, Migrates, Habitat, Beak, and Length.

The interesting aspect of this choice is that it shows that two entirely separate methods of data collection will be needed. As with most files, certain of these answers will be filled in from observation. Other queries will only be answered through

ILLUSTRATIONS BY JONATHAN INGLIS

careful research in books and libraries.

The number of fields led to an immediate problem with one of the systems! The *Junior Find* database only allows 10 fields. I had chosen 14 fields. But *Junior Find* is a superb, easy to use system. The handbook is exemplary and is to be recommended to anyone just starting out on database work. After some thought I reduced the number of fields to 10, but this is a restriction you must bear in mind.



I discovered that a file about birds already existed for *Grass*, *Junior Find* and *Find*, taken from the ITV *Animals in Action* series. On *Grass* its structure was workable but not perfect. There were two fields that I would not need – predator and picture. There was also nothing about eggs! I set out to amend the file, but after a great deal of effort, I decided it would be easier to start again from scratch. The *Grass* handbook says 'It is not possible to add fieldnames later.' However, the fieldnames *can* be altered, but you cannot add a new field. On other systems this is possible. The maximum number of fields in *Grass* is 18, and it is worth choosing a few more than you need, so that you can add extra information later. On *Junior Find* and *Find* there were 10 fields already in the files – but they were well chosen. *Find* actually allows up to 32 fields.

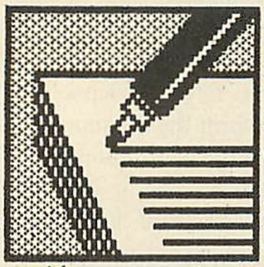
All six systems eventually accepted the fields I wanted but some were slightly easier than others. The hard thinking comes in deciding how long to make each field. The maximum allowed length of a field varies from system to system.

Supastore, *Key* and *Find* have the greatest flexibility – each field can be up to 255 characters long. *Grass* restricts you to 60 characters in a text field and 10 in a numeric field. *Inform* places no limit on the amount of text in a field, but it should be remembered that when *Inform* outputs to the screen, only 40 characters are displayed. These field length restrictions are not as important as the compromises you have to make. The database only exists to help with the selection and understanding of data, so if the data in a field is too long, then it becomes cumbersome and unhelpful to sort and it is unintelligible. This choice is difficult and crucial.

Consideration of two or three of the fields in the birds file will show how easy it is to make the wrong choices. The 'colour' field to describe the actual appearance of the bird needs to be quite long. Try describing a kingfisher with only 30 characters! And the 'migrates' field could have two possible meanings. Does the bird migrate, in which case a simple Y or N response is enough, or where does the bird migrate, for which a whole different field length is required. I chose to go for the simple short field and leave further research to the library. The 'No. of eggs' is numeric, and as no bird lays more than 99 eggs in a clutch the field length can be just two. In some of the databases, numeric field lengths do not need to be specified. With these databases, the longer the fields are made, the fewer records can be stored.

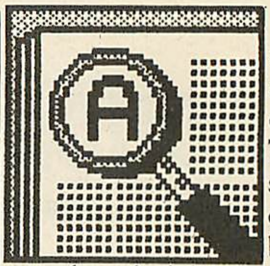
Rather oddly, some systems – *Inform* for instance – need to be told how many records are to be stored in advance of determining field lengths.

There are other types of fields available in some databases. *Supastore* allows telephone numbers as a special type, as well as integer numbers, floating point numbers and dates in dd/mm/yy format. *Key* accepts several other types advanced as fields: free text, decimal numeric, byte numeric, dependent, map co-ordinate, date, logical, tokenised and graphic. This last field type led to great troubles – but more of that later.



When it came to putting data into a file you have just created or wish to add to, there was very little to choose between the systems – with one exception. *Inform* has the most awkward and confusing screen input form that I have ever used. All of the systems allowed easy editing at a later date if you want to put more entries into an existing file. With the exception of *Inform*, all lead you through a series of menus to the point you need to be. With *Key* the number of times the discs have to be swapped during data entry is a problem, but otherwise it is superb. The two *Finds* had by far the best looking screen presentations throughout.

Undoubtedly, the way that *Supastore* enables new records to be added and unwanted record space to be reused is easier than the other systems.



Some databases are menu driven, and some are command driven. That is to say that some take you carefully, slowly, but in a friendly way through the stages necessary to find what you want – others don't! *Key* again needed more disc swapping than the others to load the file require. In fact *Supastore*, *Grass* and *Inform* keep their files on a single disc. *Find* and *Junior Find* have just one change to access the files I wanted to see.

Searching through the data to find particular features is done using the conditional comments and logical operators. Suppose you decide to try to find all the birds that are reddish in colour and therefore have a name that includes RED, you can search for records where the name field contain the word 'Red'. With *Grass* you have to specify 'Search data' and the field names appear on the screen.

Choosing name then invokes the menu:

- Includes
- Does not include
- Is the same as
- Is not the same as
- Comes before
- Comes after

Choosing 'includes', you then type in RED, and it proceeds to search the file. Easy! Except that it selects a collared dove, as well as all the expected red birds. It is important to ask the right question – which is not always the first question the students think of. Educationally, this is a great step forward.

Key is very similar. You have an option to make a simple or complex search right at the beginning.

Find is marginally the easiest to use, because all the commands stay on the screen throughout, and they are selected using the function keys.

Inform is the most difficult to use because it is all command driven and there's no list of commands on the screen. But there is a clear guide on how to use the function keys with advice on how to avoid using unnecessary commands.

All the databases allowed graphs of various types to be made by using a separate utilities disc. I particularly liked the map and graphics facilities that *Key* allows. The 'Enter Graphics Data' facility allows either a map or a graphics picture to be created as

part of the file. The maps are stored as separate files, whereas the graphics pictures are put in with the rest of the data. But you have to plan them in advance – you have to select one of the 'Advanced types' when first specifying the field names for the file you are making right at the beginning. This enables you to set aside a field for the pictures that you can create later. At first I didn't do this, and graphics that were saved on the disc were completely inaccessible. The 'Create Graphics' procedure is long and time consuming and it involves a huge number of swaps between the program disc and the data disc. But it is great fun, and you can use AMX Mouse or Grafpad as an alternative input device.

If you are to find your way around a database for the first time, then the handbooks should be a help. If you are to limit the choices for data entry, set up a sort file, configure a search, create a sub-file, merge files or any of the other available options then you need to know where to look. Some of the books really spur you on.

Junior Find and *Find* have easily the most readable and lucid handbooks. The second book with *Find* – a technical guide – should only be read by those with more experience. *Key* has an easy guide but with one or two omissions and confusing passages of jargon. *Grass* is limited but quite straightforward and is well structured. *Supastore* is much the most complex book. But then it is the most complex system with the most facilities and this is, therefore, only to be expected.

The *Inform Plus* handbook was a revelation. I used the original *Inform* and the improvement in the booklet is amazing.

All the database managers have the ability to output data as an ASCII file for use on wordprocessors or on-line systems. But they can also read and write files created by other databases. For example, *Grass* will convert files to and from *Quest*. *Find* and *Junior Find* files were interchangeable – provided that the *Find* files have no more than 10 fields. And *Find* can take files created on *Factfile*. Both *Inform Plus* and *Find* can write to and read from the *Wordwise Plus* wordprocessor.

Of the six systems I looked at, *Junior Find* was the simplest and most limited. It is, however, an extremely good system for beginners. The questions at the back of the handbook make interesting consideration for all teachers using a micro. Its big brother *Find* is really just as easy to use and can be unreservedly recommended.

For advanced users *Supastore* has everything you might need – look out for the expected *Supastore Plus* too. *Key* is a wonderful new addition to the databases for schools. It offers extremely good value compared to the others on offer.

Grass is very straightforward and plain to look at, a bit like *Quest* on the screen, but much more user-friendly and flexible. *Inform Plus* is greatly improved and is now quite straightforward to use. In the input stage it looks less interesting than the other systems, but it forms a very practical system.

All the systems can be made to fit most needs you may have. Choose your project carefully and collect the data thoroughly, because the systems to handle it are all here just waiting to be used.

Resource, Exeter Road, Doncaster DN2 4PY. Newman College, Bartley Green, Birmingham B32 3NT. Nottingham Council, Trent Bridge House, Fox Road, Nottingham NG2 6BT. ESM, 32 Bridge Street, Cambridge CB2 1UJ. GSN, 214 Stamford Street, Ashton under Lyne.

	Junior Find	*Find*	*Inform Plus*	*Grass*	*Key*	*Supastore*
Maximum number	10	32	24	18	60	250
Maximum field name length	15	15	8	14	14	10
Maximum record size	2000	2000	None	None	None	3000
Field types available	Text Numeric	Text Numeric	Text Numeric	Text Numeric	Text Numeric Graphics and others	Text Numeric Integers Dates Phone Nos.
Printer options (Epson compatible)	Bar charts Pie charts Scattergram Scatter table	Bar charts Pie charts Scattergram Scatter table	Various graphs and labels	Bar chart Pie chart Scatter graph Cumulative graph Average/ median	Bar chart Pie chart Venn diagram Statistics Graphics	Reports Labels Graphs
Cost	£20.95	£23.95	£15	£25	£4.95	£39.95
Ease of use:	8	8	5	6	7	7
Search	8	9	7	7	9	7
Documentation	7	8	8	6	8	7
Overall rating	8	9	7	7	9	7

How the databases compare

DATA FILES AVAILABLE

AUCBE sell *Quest* files for subject areas including: home economics, geography, environment, biology, chemistry, weather, art, general studies and history.
The Advisory Unit for Computer Based Education, Endymion Road, Hatfield, Herts AL10 8AU. Tel: (Hatfield) 65443.

Peterborough Educational Development Centre produces a small catalogue of *Quest* files based on Peterborough, including: environmental studies, census returns and Domesday material.
Peterborough Educational Development Centre, Peterborough, Cambridgeshire.

Nottinghamshire Computer Education Support Centre has a catalogue available of *Inform* files produced jointly with MEP East Midlands. Subject materials on the catalogue file, which is itself in *Inform* format, include: road safety, geography, biology, chemistry, weather, history and support material.
Notts Computer Education Support Centre, Eaton Hall, Retford, Notts.

The **ITV** companies produce a variety of *Key* data files, for example: weather, birds, myself, food and diet, materials, mammals, cities, place names and farming.

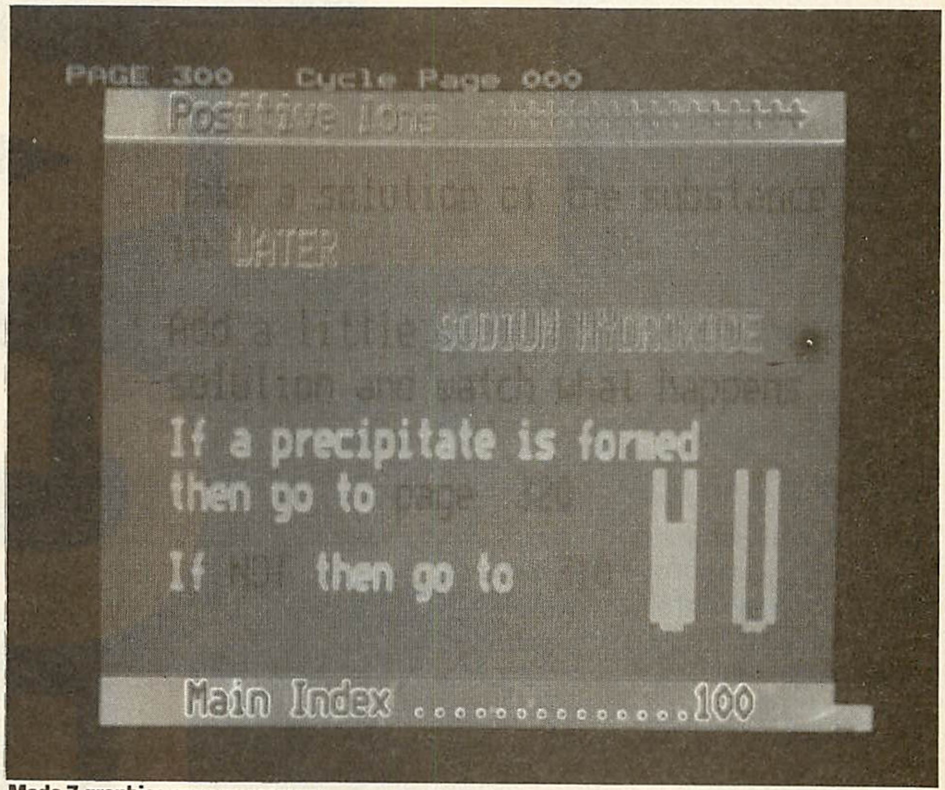
ELECTRON A LA MODE

In case your Electron hasn't already taken over half your house with add-ons, there's another to give you true mode 7. Bernard Emblem investigates

When it launched the Electron in 1984, Acorn made the ambitious promise that owners would one day be able to add on all the facilities available as standard on the BBC micro. Little did we realise that Acorn would soon lose interest in the machine. But the Elk proved to be a reliable micro with loads of potential, which is slowly but surely being fulfilled by independent manufacturers.

With the Elk capable of running at BBC speed via Slogger's Turbo board or the PMS second processor, and a choice of inexpensive disc interfaces and drives, user ports and sideways RAM now available, the machine's lack of mode 7 has become the only significant BBC feature not available to Elk users.

Mode 7 is important and useful for several reasons. It offers text and limited block graphics in any colour. It uses only 1k – far less memory than any other mode – to display the teletext graphics used for email and teletext, and it has by far the most attractive character set.



Mode 7 graphics save on memory

However, the omission of mode 7 was not just a case of Acorn being awkward. Modes 0 to 6 are basically variations on a theme, and the circuitry fits on to a single chip in the Elk, but mode 7 requires a chip unto itself and so is comparatively expensive to install.

Jafa is a small company run by the man who was the brains behind the excellent second processor now marketed by PMS. Its mode 7 adaptor is about the size, shape and colour of a Plus One or a Slogger ROMbox; it plugs in and bolts on to the back of the Elk in the same way. With the adaptor in place, mode 7 can be called with the command *MODE7ON, followed by a standard Break. A thoughtful provision is the new command *HELP BARS. This gives a seven-colour bar display, which proved very useful for adjusting brightness, colour and contrast.

The BBC's *TV n, where n is used to specify the number of blank lines to be shown at the top of a TV screen, is also implemented. The adaptor has its own Break key on top – functionally it replaces the Elk's own Break key, and mode 7 is just as accessible from your programs as modes 0 to 6.

Users also now have the option of BBC or Elk-style function keys. Few Elk owners would concede that their function keys are inferior to the Beeb's, so I'm not sure the adaptor should default to Beeb settings as it does.

Given the right hardware, the Elk will now run ROMs such as the BBC's *Wordwise Plus*, and existing Elk ROMs such as *View*, *Viewsheet* and Lisp in mode 7. My Plus One and Master RAM board continued to work perfectly and BBC mode 7 adventure games ran without complaint.

As mode 7 is the teletext mode, teletext control codes and graphics are now available. As the adaptor contains the same mode 7 display chips as the BBC micro, programming with the unit is just like using mode 7 on the Beeb. Seven colours plus black are available, as are different backgrounds, double height letters and flashing characters. Chunky and limited teletext graphics are possible, if you have the patience to use them.

Unfortunately, Jafa's user guide gives only a perfunctory description of these facilities, preferring to refer readers to chapter 28 of the BBC User Guide. Those without access to a Beeb might do better to buy a beginner's guide.

Electron users have been able to use electronic mail for some time, but a teletext mode, plus a bit more hardware, makes Prestel almost as accessible as on a Beeb.

The adaptor costs a lot because it contains much of the display circuitry that is inside a BBC micro, plus a few other chips too. At £89, the mode 7 adaptor represents a serious financial investment. Is it worth it? Well, it all depends. For the average games player, probably not – but if you have a yen for Prestel, or have a need for BBC compatibility, for an extra 7k memory, or just can't do without that beautiful mode 7 character set, go on, spoil yourself.

Jafa Systems, 9 Lon-Y-Garwa, Caerphilly, Mid Glamorgan. Tel: (0222) 887203.

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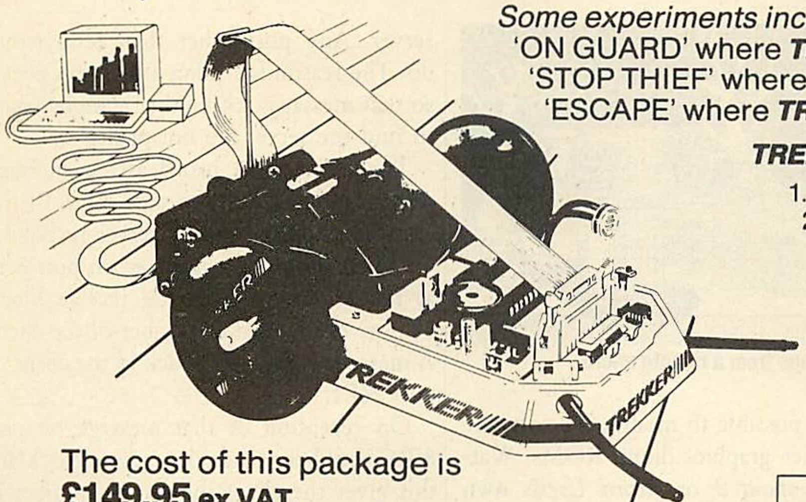
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8. Sound its horn)
9. Sound its alarm) All as often
10. Sound its siren) as you choose

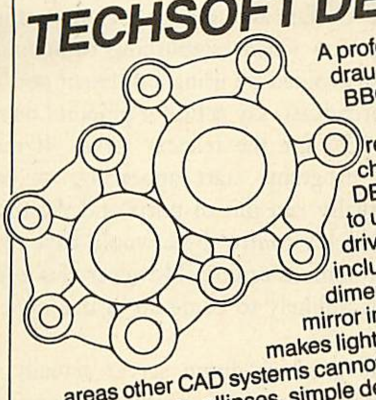
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TECHSOFT

TECHSOFT DESIGNER

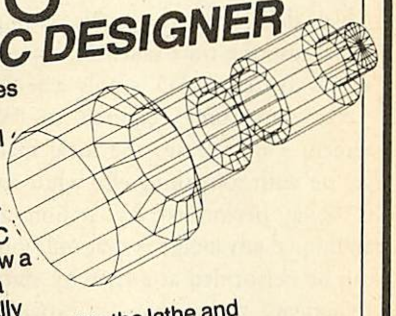


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THE NETWORK PAGE

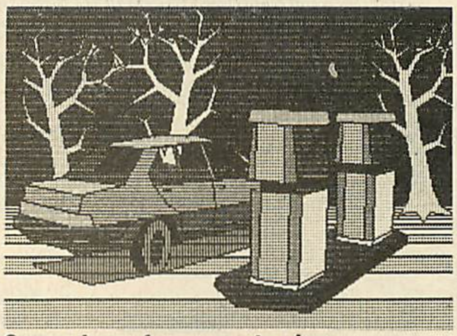
You can set up one on your Econet micro as a graphics dump server with these programs

Alastair Shimmin & Robin Newman

One of the problems which came to light as soon as we installed our network at Wellington College in 1984 was the inability to perform graphics dumps without having a printer on every station. The problem was a bug in the NFS 3.34 chip which prevented screen dumps being sent to the normal network printer server, so there didn't seem much that we could do about it. But, before long, one of our pupils devised a rather neat solution. The idea was that if a station wanted to perform a graphics dump then this could be done by sending a copy of its screen to station 235 and station 235 would then do a dump of its own screen to a local printer.

Since then the software has been enhanced several times, although the basic principle remains the same. This software is still one of the items the school receives most queries about and, rather surprisingly perhaps, we still use this technique for graphics dumps ourselves despite having upgraded all our machines to NFS 3.6 – which does support graphics dumps. This is because the time taken to copy a screen across to station 235 is only a few seconds – the same time required to *VIEW a screen. This releases the local machine to get on with something else while the dump is being performed by station 235. An additional advantage is that only one dump can be performed at a time by station 235. Experience shows that if a program offers the option to dump a screen, then students always like to try this out. If all these dumps were queued by the file server, then a lot of disc space would be used and other users wanting just a short listing would have a long wait.

On our network, station 235 contains a Computer Concepts *Printmaster* ROM, and so can perform a wide variety of dumps. The routine for copying a screen to station 235 also allows parameters for the *Printmaster* GDUMP command to be sent. In this way every station on the network has access to all the dumps allowed by the ROM. It is also worth noting that as there is only one *Printmaster* ROM you don't have to worry about a site licence! It



Screen dumps from a remote micro

should be possible to modify the software to use other graphics dump ROMs. Watford's *Dumpout 3* or *Acorn User*'s own *User Dump*.

The only drawback is that station 235 becomes dedicated to graphics dumps and so is not normally used for anything else. Such a station may be termed a 'server', so we normally refer to station 235 as our graphics dump server. Stations communicating with the server are termed 'clients'. The graphics dump server runs a Basic program and the client runs a machine code transient.

A server can be a good use for very old BBC micros approaching the end of their life. Their keyboards are often the parts that become most unreliable, and of course a server doesn't rely on the keyboard once it is running.

Before explaining how the graphics dump server program works, we think it's worth a short diversion into the method of making two stations establish a communication link.

Communication cannot commence properly until both stations know the other's station number. This is not too difficult to sort out if one of the stations is a server. The exchange will be as follows: The server opens a receive block on a port allocated for user programs. These are ports &E0-&FE. For the purpose of this example we will assume that port &E0 is used. The block must be open for all stations as at this stage the client station number is not known.

The client opens a receive block on port &E1 ready to receive a reply from the server. Any port other than &E0 would do. The reason for using a different port is so that messages from other stations trying to find the server are not picked up.

The client then broadcasts a message, which could be null, on port &E0. Broadcasts are repeated until a server responds.

On reception of a message on port &E0 at the server, it reads the receive block. This gives the station number of the client. A message is then sent back to the client on port &E1.

On reception of that message on port &E1, the client reads the receive block and this gives the client the station number of the server micro.

Both stations now know the other's number and, from this point on, ordinary transmit and receive methods can be used pretty much on whatever ports you like, as there is no possibility of other stations picking up the messages.

We actually have two dedicated servers, plus an occasional adventure game server. The dedicated servers are for graphics dumps and one is for sending teletext pages from Ceefax and Oracle to any station. Confusion when establishing communication is avoided by using a different port for the broadcast; say &E0 for graphics dumps and &F0 for the teletext server. If more such programs start appearing, we will eventually run out of ports and the transmit block's control byte would have to be given some meaning. However this problem is unlikely to come up in the immediate future.

The graphics dump server actually receives broadcasts on port &9F because it can also act as an ordinary printer server. A broadcast on &9F is interpreted as an enquiry about the printer status. The broadcast contains six bytes of data, which is the name of the printer you are enquiring about. The server responds on port &9E with a status byte which is 0 if it is 'ready' or 1 if it is 'busy'. If busy then the station number of the station currently being served is also sent. The printer name is by default 'PRINT' but can be any name. The graphics dump server responds

to the name 'NDUMP' (Network DUMP), and this name is used by the client's program in order to find the station number of the server. The graphics dump server can respond to the *POLLPS command with something like 'Station 235 busy with 245', while performing graphics dumps, in the same way as when a normal printer server is busy.

Because the graphics dump server also acts as an ordinary printer server it makes the printer server ROM redundant. Also, although I have assumed that the program is running in station 235, it will run in *any* station, and could be running in several at once. As the printer status enquiry call is implemented in full, the *PS command can be used to select a free printer for text.

In order for a graphics dump to be performed, several bits of information have to be transferred to the server before the screen itself. This information is as follows: the mode number; then the colour palette are sent (this is to take account of any VDU 19 commands which the client may have issued). Next is the start of screen address, this is to take account of the fact that the client's screen may have been scrolled. Then, there are the parameters for the GDUMP command.

This information is packaged together into a buffer by the client and then sent to the server, so the server can prepare to receive the screen by changing itself to the right screen mode and performing the necessary VDU 19 commands.

Finally, the screen itself is sent from the client to the server. This was how our software worked for a couple of years, until the school net required a bridge. This was not a problem in establishing communication, as reading a receive block gives both the station and network number. The snag was that the Econet bridge only has a buffer of 5k, and so a 20k screen cannot be transferred all in one go. The solution is for the client to send the screen in as many 5k chunks as necessary. A complication arises when server and client disagree about whether one of the chunks was sent successfully or not. This can happen if the last part of the four-way handshake fails. This results in the client thinking that its transmit failed but the server thinking that everything is OK. This is a rare event, but it can happen. The same is true of any data sent in chunks like this, and the way round the problem is to introduce a sequence number as part of the control byte. This is exactly what the normal printer server does. Successive packages of data have bit 0 of the control byte switched. If nothing goes wrong then successive packages will have control bytes of &80, &81, &80, &81 and so on. But if the client thinks a transmit has failed then the package will be transmitted again so the server may receive control bytes of &80, &81, &81 &80. The server copes with this by ignoring any package which has the same control byte as the previous package. In this way client and server get back in step with each other.

The other eventuality the server has to cope with is a client who does something stupid like pressing 'Break' at the wrong moment. To eliminate problems a timeout is included in the server so that it gives up communication with a client if there is no response for 10 seconds.

Implementing the whole of the above for the graphics server meant that some compromise had to be made due to the limited amount of transient command workspace in pages &E00 and &F00 on the client. The compromise is to have two separate machine code routines which can be run by the client.

*NDUMP, listing 2 on the yellow pages, is a full implementation of what is described above except that parameters for the *Printmaster* GDUMP command are not allowed. In contrast, listing 1, *GDUMP, allows parameters for the *Printmaster* GDUMP command, but assumes that the graphics dump server is station 0.235. You can change this by altering line 630 in the listing before assembling GDUMP.

In practice, this means the only problem you might have is if you want to perform some non-standard dump across the bridge, although it would be possible to assemble a 'special' version of GDUMP by changing line 660 to allow for the network number containing the printer server: say LDA #2 if the network containing the printer server was number 2.

In general, this technique can be used to make any piece of equipment available to all network stations, provided you are prepared to dedicate a station to act as a server. We recently bought a Plotmate flatbed plotter, and found that as it accepts standard VDU commands it was very easy to alter the graphics dump server program so that it could run either the Epson MX80 parallel printer for graphics dumps or the plotter via the serial interface.

One final point. One version of the printer server program was used to drive a daisy-wheel printer (for text only, of course). Because of the slow action of this

JARGON BOX

Server: A network station running special software which enables it to receive and process commands sent to it from other network stations which are called client stations.

Network Packet: A group of bytes sent along the network cable. These will usually include details of the sending and receiving stations' numbers, together with some data.

Four-way handshake: This is a phrase used to describe the normal method of network communication which proceeds as follows:

Station A sends to station B: Are you there? (a *scout* packet)

Station B sends to station A: Yes I'm here (an *acknowledge* packet)

Station A sends to station B: Here's some data (a *data* packet)

Station B sends to station A: I've got that (an *acknowledge* packet)

Port: Packets carry the address or station number of the station for which they are intended. In addition a port number is specified in the initial scout packets. For the data to be received the transmitted port number must match the port number on which the receiving station is expecting to receive the data. The port number is analogous to the channel number of a TV broadcast – only those TVs which are tuned to the correct channel will see the broadcast.

Broadcast packet: A group of eight bytes which is transmitted without specifying the receiving station. Thus any or all stations can receive the packet, provided that they are listening on the right port.

Receive block: A section of memory which is set up with details of the station numbers to listen for, and the port to listen on. Once activated it will await reception. The address of the buffer (an area of memory) where the received message is to be stored is also contained in the parameter block.

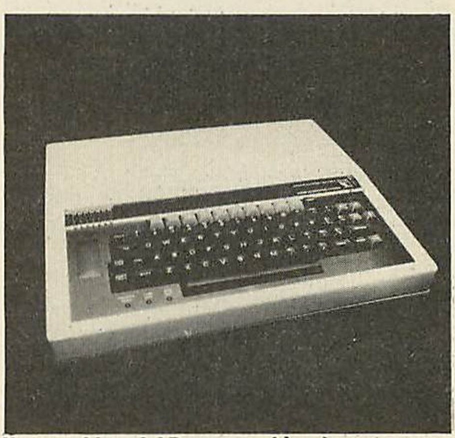
Transmit block: A section of memory which is set up with details of station number to which a message is to be transmitted, and the port upon which to transmit it. The address of the buffer containing the message to be transmitted is also contained in the block.

You can also glean more information from *The Advanced Econet User's Guide* published by Acorn, or in the *Network Manager's Manual* for an SJ fileserver.

printer, a delay was added to the printer server program to prevent the client station from timing out. This delay can be put back if desired by altering line 110 in the server program. The d variable is the delay time, in hundredths of a second.

So, to set up your graphics printer server, make one station at the net fitted with a printer run the PSHORT program. Then all the other stations can use the *GDUMP or *NDUMP commands to print a copy of their screens.

So that you can follow what happens in the printer server program, two versions are included on the monthly disc. In the first, PFULL, long variable names are used, and REMs are included to explain what is going on. Unfortunately, this version is too long to work in a model B, so a second, cryptic, version, PSHORT, is included – and is listed on the yellow pages. This version is short enough to work correctly on a model B fitted with Econet but *not* with DFS. In other words, the default value of the PAGE *must* be &1200 or lower. Using one of the many toolbox cruncher programs available will compact it further, so it will work on a disc plus network machine.



Use an old model B as a graphics dump server

In addition, one or two amendments can be made. The printer server program uses two utilities supplied on SJ Research file, servers, called PTIME and PDATE. If you do not have these you can either use the equivalent Acorn utilities, or you can omit line 1040 and change line 1030 in the PSHORT version of the listing to: PRINT;s AND &FF.

If you wish to use the server mainly with wordprocessors as a standard printer server, then you can suppress the banner text printed above each printout by deleting lines 1000 to 1060. Likewise you can suppress the page feed at the end of each station's output by deleting line 770 (for text dumps) or line 1100 (for graphics dumps). However, I recommend you retain this latter line.

If you do not have a *Printmaster* ROM but have another printer dump ROM, then you should be able to amend the PSHORT program to allow for this. Line 1520 can be changed to use the command(s) appropriate to your ROM.

Diary dates

Finally, some dates for your diary. One-day network courses are being offered at Felsted School on May 7 and June 18. Further details available from Chris Dawkins on (0371) 820527.

Chris will also be running a session on Econet at the MUSE Conference held in Nottingham, from July 25-27. Tel: (0533) 433839 for further details.

There will be a one-day network course at Wellington College in July. This will be mainly aimed at network managers running SJ file servers. Tel: (0344) 779020 for further details of the course.

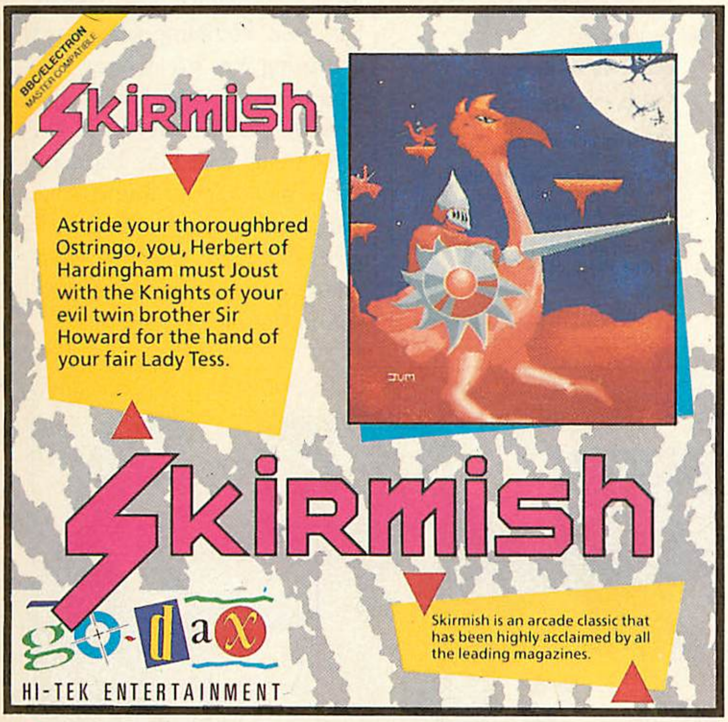
Details of the Network Page listings are on the index on page 111.

ACORN USER ADVERTISEMENT PAGES – MAY 1988

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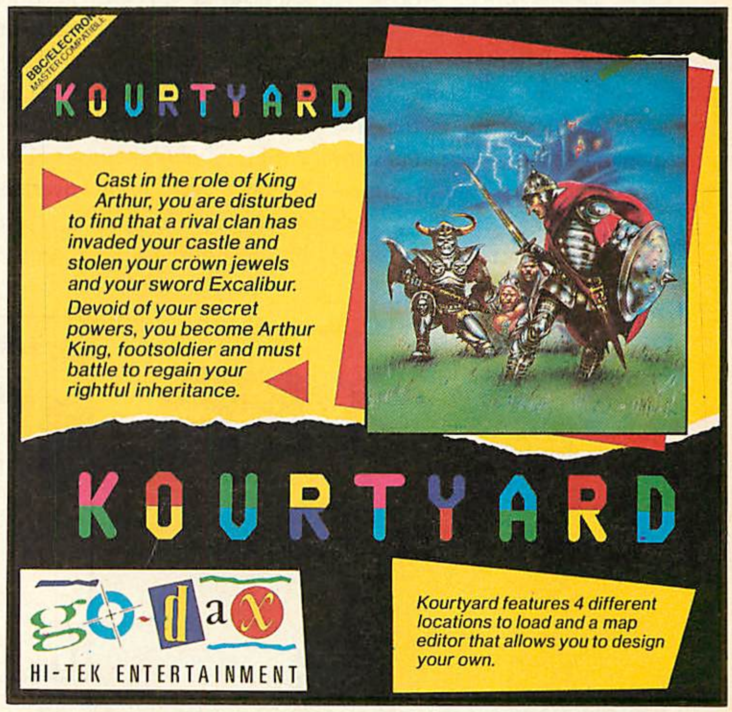
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CYBOTO - By Gary Pennington, Cyboto is a fast action arcade extravaganza depicting Ambrose the Cybot in a life or death quest around the universe for the pods of Rana.

BOLO - By Delos D Harriman, In his latest programme, the author of the highly acclaimed "Skirmish" has broken new ground in producing a multi-player, multi computer, game which will allow many BBC's to be interfaced together in a room or via a modem. Each BBC will show a screen dipicting that players forces in this tank battle, and will also show information unique to that player. Go-Dax are immensely excited by the prospects that Bolo offers and feel it hints at the future of the Computer entertainment media.

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ACORN USER'S

DIARY

Flight of fancy

Our April fool on the Games Page last month, describing a BBC B version of the Archimedes game *Zarch*, certainly caught out a few unexpected 'personalities'. Among the people who phoned us pleading for further advance information was Steve Botterill, the sharp-suited Johnathan Ross of the micro world. In real life, he's known as General Manager of Superior Software, the company we claimed that were about to launch the new game. This speaks volumes for communications up in Superior's Leeds office, for Steve's boss Richard Hansen was definitely in on the spoof.

And we also caught out Ian Burley, cuddly, polite and respectful news editor of Micronet. Z88 junkie Ian apparently drew hysterical laughter from the technical staff at the Net when he started to enthuse about the 'forthcoming' game.

Artist in residence Holly de Snappe did the screen shot in an hour or so with Watford's *Quest Paint*. But perhaps the last laugh will be on us. Just as the spaceship plotting routines from *Elite* were started on an Atom, *Zarch*'s author David Braben has been overheard muttering 'I'm sure it's possible' to himself a lot recently.



We've been waiting for months for an excuse to run this picture



Abuser art

Following last month's announcement of the Tony awards, Fairhurst Instruments has been hounding Orson for confusing his pre-release version of *Arctist* with the quality version available to you. On catching up with him, Fairhurst thrust a package of four *Arctists* into his trembling hands. We'll give them to the first four Abusers to spot the Acorn person in the picture below.



Every one a winner

Several people have won Archimedes machines in competitions arranged by publicity-conscious dealers.

Two winners emerging from magican Paul Daniels' BBC quiz show *Every Second Counts* couldn't wait to get their hands on Britain's fastest micro. Proud winner Mrs Marie Lacey is obviously an optimist; according to Acorn's press release she is 'looking forward to using the word-processing facilities' as well as keeping her husband amused with the wide selection of games available. *ArcWriter* (above) might well be described as 'family fun'. Perhaps Paul Daniels managed to pull some working wordprocessor software from his magician's hat.

Paul's prestigious association with Acorn is long; it stretches back to 1985, when he helped with the legendary *Paul Daniels' Magic Show* software.

Ave atque vale, Forum!

Agora? What does this mean? Well we were going to call our new column Arc Forum, but ace reporter Orson Fact (cursed with a classical education) spotted a flaw. We've abused Acorn for mixing Latin and Greek with 'Hail, Archimedes' – and they haven't run that ad since. Arc Forum would be doing the same, so it's Agora, Greek for meeting place.





In the Heat of the Battle

Selecting a Battalion

A Mighty German King Tiger Tank

Planning your Offensive

CONQUEROR—The Software Revolution Rolls On

Step into the tank of your choice and experience the thrill of controlling one of the most powerful land vehicles in the world.

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This game is well-documented with extensive information provided on all of the 12 types of tank involved. Now's the time to see if you can become . . .The Conqueror.

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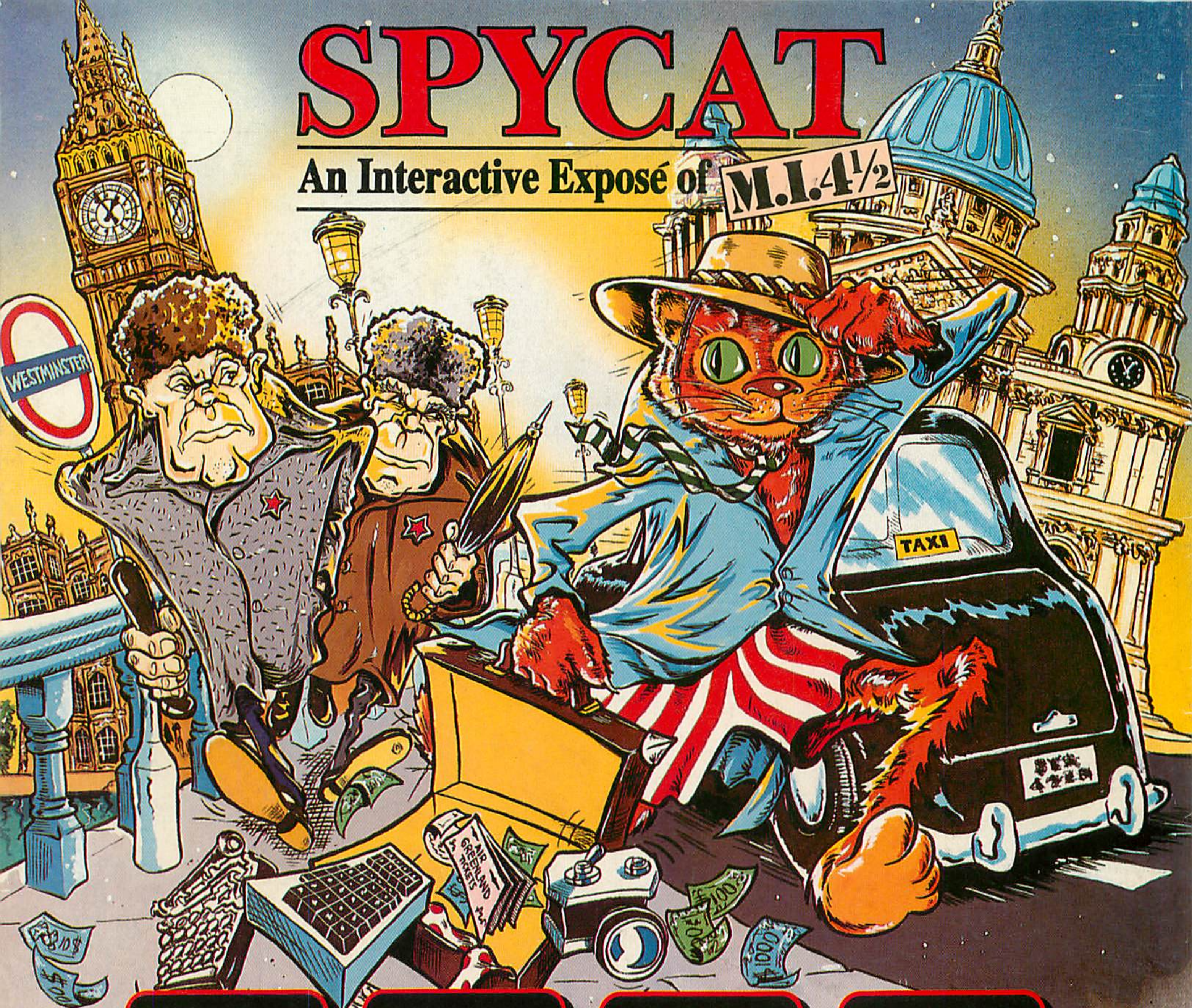
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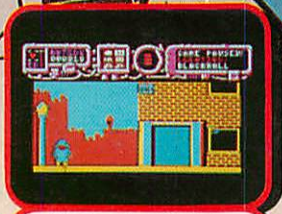
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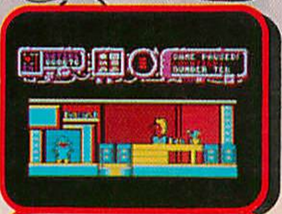




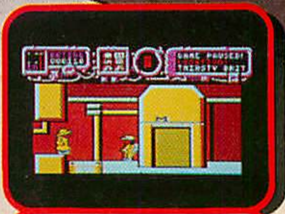
The London Skyline Viewed from Blackhall



Outside No. 10 Drowning Street



Meeting the P.M.



Waiting to see "M"

All the Thrills and Intrigue of the World of Espionage

Spycat is a skilfully-written arcade adventure game which takes place amongst the corridors of power in Blackhall, Drowning Street and the M.I.4½ underground surveillance complex.

You play the role of Spycat: a cat with a purpose. You are devoted to spending your life embroiled within the fascinating but dangerous arena of professional secrets. It's a good career — full of security; and when you retire you can always supplement your pension by emigrating to Greenland and publishing your memoirs.

The game features nearly 100 different screens, with 30 different objects — including computers and passports — to locate and employ in appropriate ways. An icon-driven control system is used to orchestrate your manoeuvres and actions. There are secret passages to discover, and hatches and lifts to assist your progress. Guest appearances are made by: the Prime Minister and the spy-chiefs "Q" and "M".

Spycat is a thoroughly captivating game. To complete the adventure, you will need to use clear logical thought as well as fast reactions and arcade skills. Your life as an undercover cat may not be easy but it will always be exciting!

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